Nonpoint Source
PROGRAM

Louisiana Nonpoint Source
Annual Report
Federal Fiscal Year (FFY) 2011

DEQ
LOUISIANA

MANAGING NONPOINT SOURCE POLLUTION IN LOUISIANA

2011 ANNUAL REPORT

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Acronyms and Abbreviations

BMP ..... Best Management Practice
BTNEP ..... Barataria Terrebonne National Estuary Program
CNPCP..... Coastal Nonpoint Pollution Control Program
CPRA..... Coastal Protection Restoration Authority
CREP..... Conservation Reserve Enhancement Program
CRP..... Conservation Reserve Program
CSP ..... Conservation Security Program
DO..... Dissolved Oxygen
EQIP ..... Environmental Quality Incentive Program
ERC..... Environmental Regulatory Code
FBMP..... Forestry Best Management Practice
FFY ..... Federal Fiscal Year
GIS ..... Geographic Information System
GOMA..... Gulf of Mexico Alliance
GOMP..... Gulf of Mexico Program
GRP..... Grasslands Reserve Program
IR ..... Integrated Report
LDAF..... Louisiana Department of Agriculture and Forestry
LDEQ ..... Louisiana Department of Environmental Quality
LDHH ..... Louisiana Department of Health and Hospitals
LDNR..... Louisiana Department of Natural Resources
LMRCC..... Lower Mississippi River Conservation Committee
LPBF ..... Lake Pontchartrain Basin Foundation
MOU ..... Memorandum of Understanding
MRBI..... Mississippi River Basin Initiative
NPS ..... Nonpoint Source
RC&D..... Resource Conservation and Development
SWCD..... Soil and Water Conservation District
USEPA..... United States Environmental Protection Agency
TMDL ..... Total Maximum Daily Load
USDA..... U.S. Department of Agriculture
WHIP..... Wildlife Habitat Incentive Program
WRP ..... Wetlands Reserve Program

1.0 Executive Summary

The Federal Fiscal Year (FFY) 2011 Nonpoint Source (NPS) Annual Report has been prepared in compliance with Section 319 of the Clean Water Act (CWA). The purpose of the report is to provide an overview of progress made in reducing NPS pollution and improving water quality in the State of Louisiana. NPS pollution is associated with a number of activities, including agricultural production, forestry, sand and gravel mining, urban stormwater runoff, construction, and individual home sewage systems. Although Louisiana Department of Environmental Quality (LDEQ) has been designated as the lead agency for the NPS Program, many other agencies and organizations partner with LDEQ to implement statewide and watershed activities to improve water quality. This interagency coordination is the strength of Louisiana's NPS Program, resulting in water quality improvement and success stories for the state.

During FFY 2011, the State of Louisiana continued to make progress in implementing the NPS Management Plan. The draft 2011-2016 NPS Management Plan has been provided to U.S. Environmental Protection Agency (USEPA) Region 6 for final approval and is available online at http://www.deq.la.gov.

In addition to revising the NPS Management Plan, LDEQ prepared a success story for Bayou Bartholomew and submitted it to USEPA Region 6 in 2011. LDEQ is currently addressing USEPA's comments on the success story. Bayou Bartholomew was delisted for dissolved oxygen (DO) in 2010 and water quality data indicated reductions in total suspended solids (TSS) and nutrients from implementation of agriculture, forestry, and pasture best management practices (BMPs). LDEQ set a goal to prepare and submit three (3) NPS success stories to USEPA in 2012.

During FFY 2011, LDEQ continued to focus on water quality problems associated with urban stormwater runoff, construction activities on roads and highways, individual home sewage systems, agricultural production, forestry activities, hydromodification and sand and gravel mining operations. The NPS Program partnered with stakeholders in watersheds to replace, update and/or remove failing sewage systems and provide the public with information on maintaining their existing systems. Several of Louisiana's parishes have experienced rapid growth and development; therefore, establishing ordinances which require BMPs for new and existing development and individual home sewage systems.

During FFY 2011, LDEQ's NPS Program hosted the 4th Annual Project Review meeting in November. All projects funded by a CWA Section 319 grant were presented to LDEQ, USEPA Region 6, watershed coordinators and partners implementing NPS projects. This annual review meeting continues to provide an opportunity for active participants in the grant program to share and/or exchange information and ideas on solving NPS problems. During the meeting, 18 presentations were made on NPS projects and progress reports were provided by each of the watershed coordinators.

This year NPS program staff participated in 27 educational outreach events for the public, reaching approximately 13,524 people. These events allowed NPS and Source Water

Protection Program (SWPP) staff to interact with community leaders, schools, churches, and local residents. One highlight included LDEQ's environmental stewardship message of "Be the Solution" being broadcast in movie theaters across Louisiana, reaching approximately 752,587 people at 121 theaters during the summer movie season (July 1-September 30th).

The NPS Program continued to focus on priority watersheds with LDEQ's coordinators and NPS staff partnering with stakeholders to reduce NPS pollutants and improve water quality in Louisiana. Through stakeholder involvement, watershed implementation and targeted water quality monitoring, NPS pollutants can be reduced and the state's water quality should improved. Two (2) new watershed task forces in Orleans and Terrebonne parishes were formed and St. Martin, St. Landry, St. Mary, and Iberia parishes agreed to monitor water quality in Bayou Teche.

Highlights of the State's NPS Management Program for FFY 2011 included:

- LDEQ prepared and submitted a success story to USEPA for Bayou Bartholomew;
- LDEQ continued implementing (24) NPS projects to reduce NPS pollution entering the state's water bodies;
- LDEQ continued watershed planning and implementation activities with nine (9) watershed coordinators located throughout the state;
- LDEQ continued working through their Geographic Information System (GIS) Center on detailed satellite imagery classification of land-uses for Calcasieu, Ouachita, and Sabine River Basins. This data is utilized for watershed planning and BMP implementation in impaired watersheds as well as protection of healthy watersheds;
- LDEQ partnered with United States Department of Agriculture (USDA) on the Mississippi River Basin Initiative (MRBI) to select monitoring sites in priority watersheds in Louisiana;
- LDEQ expended approximately $2.7 million of Section 319 grant funds to implement projects to reduce NPS pollution and improve water quality;
- LDEQ included a new water quality goal in the revised NPS Management Plan to partially or fully restore 37 NPS impaired water bodies by October 2016;
- LDEQ partnered with parishes and police juries to implement hydromodification BMPs in hurricane-related stream restoration projects;
- LDEQ partnered with parishes to develop stormwater ordinances, requiring inclusion of BMPs in new and existing developments; and
- LDEQ partnered with Louisiana Department of Natural Resources- Coastal Restoration and Protection Authority (LDNR-CPRA) to finalize responses to comments on Louisiana's Coastal Nonpoint Pollution Control Program (CNPCP).

In FFY 2012, LDEQ will continue to partner with watershed coordinators on watershed implementation plans (WIPs) to restore water bodies impaired by NPS pollutants. Through partnerships and close coordination with Louisiana Department of Agriculture and Forestry (LDAF), LDEQ will implement agricultural activities and management practices to reduce NPS pollutants in more than 10 watersheds, with a goal of improving water quality in 37 water bodies by October 2016. LDEQ will also continue to partner with stakeholders on statewide programs to reduce NPS pollutants from agriculture, forestry, home sewage systems, hydromodification, sand and gravel mining and urbanized areas.

2.0 Water Quality Improvement

2.1 Louisiana's Progress on WQ-09(c), WQ-10 and SP-12

Louisiana's NPS Program has made significant progress in restoring or partially restoring NPS impaired waters. USEPA's National Water Program included three (3) water quality measures for states to report NPS improvements; WQ-09(a-c), WQ-10 and SP-12. Louisiana reports on measure WQ-09(c), which requests states to report on estimated annual reductions in sediment from NPS to the state's water bodies. During FFY 2011, LDAF reported 28,224 tons or 56 million pounds of sediment were reduced through implementation of agricultural BMPs in Mermentau River Basin.

Measure WQ-10 requests states to report on the number of water bodies identified in 2000 or subsequent years, primarily impaired by NPS pollutants that have been partially or fully restored. The state's 1999/2000 Integrated Report (IR) included approximately 155 water bodies with NPS-related impairments. Of those original 155 NPS impaired water bodies, 26 have been fully restored and 109 have been partially restored. Since 1999, LDEQ increased the number of water bodies it monitors and assesses on a bi-annual basis. Between 2000 and 2011, LDEQ monitored and assessed 476 water bodies for compliance with water quality standards. Based on Appendix C of the 2010 IR, approximately 295 of those 476 water bodies have had one or more pollutants delisted since 2004. Table 1 provides a comparison of 2000 and 2010 NPS impaired waters. This table indicates significant improvements in Lake Pontchartrain, Mermentau, Ouachita, Vermilion-Teche, Terrebonne and Barataria Basins since 2000.

Measure SP-12 requests states to report on the number of watersheds (i.e. 12 digit hydrologic units) that have been partially or fully restored through a watershed approach. LDEQ continues to review the IR each reporting cycle to determine the number of watersheds partially or fully restored because of watershed implementation. The 2010 IR included approximately 16 water bodies that could be reported through SP-12, and LDEQ has committed to submit three (3) -four (4) NPS Success Stories during FFY 2012 for NPS restored waters.

River Basin (Basin Number)	Number of NPS-Impaired Waterbodies (2000 IR)	Number of NPS-Impaired Waterbodies with Full Restoration in 2010	Impaired Waterbodies with Partial Restoration in 2010
Atchafalaya (01)	2	1	1
Barataria (02)	9	3	6
Calcasieu (03)	2	0	2
Pontchartrain (04)	42	11	31
Mermentau (05)	19	-	11
Vermilion-Teche (06)	37	2	23
Mississippi River (07)	4	2	2
Ouachita River (08)	14	1	13
Pearl River (09)	6	-	6
Red River (10)	1	1	-
Sabine River (11)	-	-	-
Terrebonne (12)	19	5	14
Total	155	26	109

Table 1 - Number of water bodies with NPS impairments that have been partially or fully restored

2.2 Interagency Coordination with Stakeholders

During FFY 2011, LDEQ's NPS Program continued to partner with stakeholders to address NPS problems in their respective watersheds. Through partnerships with Lake Pontchartrain Basin Foundation (LPBF) and Bayou Land Resource Conservation & Development (RC&D), the Terrebonne and Orleans Task Forces were created to reduce NPS water quality impairments. LDEQ's staff and watershed coordinators have monthly or bi-monthly meetings and conference calls to discuss problems and potential solutions to achieving water quality goals of the NPS Program.

Partnerships with Louisiana Department of Health and Hospitals (LDHH) and LDNR assist LDEQ in reducing NPS problems associated with home sewage systems and coastal NPS problems. Similarly, partnerships with USDA, USEPA, LDAF and watershed coordinators should result in nutrient and sediment reductions in water bodies prioritized through USDA's MRBI. In Louisiana, MRBI prioritized Bayou Lafourche and Turkey Creek in Ouachita River Basin, and Bayou Chene and Bayou Lacassine in Mermentau River Basin. The results of these projects will be included in Louisiana's Nutrient Reduction Strategy and shared with the Gulf

of Mexico Alliance (GOMA) Nutrient Priority Issue Team (PIT) and the Hypoxia Task Force. During FFY 2011, USEPA provided LDEQ with an additional $1.1 million in Section 319 funds to monitor water quality results of MRBI projects in Louisiana.

3.0 NPS Funding

The NPS Program leverages funds received through Section 319(h) of the CWA with other funds, such as USDA Farm Bill, to implement goals and objectives of the NPS program. During FFY 2011, LDEQ's NPS Program implemented 24 projects to reduce NPS pollution and/or improve water quality in Louisiana. These projects expanded NPS implementation, planning, and educational outreach activities in the state. A project to re-evaluate the state's current coastal zone boundary was funded through Section 319 and will be utilized by LDNR and LDEQ to implement the state's CNPCP.

During FFY 2011, LDEQ spent approximately $2,694,100 in federal funds for NPS and Source Water Protection staff, watershed coordinators and NPS projects to protect recreational waters and drinking water supplies. Table 2 provides a description of Section 319 grant expenditures during FFY 2011.

Incremental funds were utilized by LDAF for implementation of agriculture BMPs in watersheds where WIPs and Total Maximum Daily Loads (TMDLs) have been completed. In FFY 2011, LDAF's Office of Soil and Water Conservation (OSWC) expended approximately $2,646,196 of Section 319 funds for agricultural BMPs in Mermentau River Basin. The activities of LDAF resulted in implementation of 16,993 acres of BMPs. During FFY 2011, the combined expenditure of base and incremental funds was approximately $5.34 million for NPS activities in Louisiana.

Grant Year	LDEQ (Federal)	LDAF (Federal)	Total
2005	615,099	-	615,099
2007	753,996	-	753,996
2008	518,683	2,153,284	2,671,967
2009	800,972	492,912	1,293,884
2010	5,350	-	5,350
Total	2,694,100	2,646,196	5,340,296

Table 2 - LDEQ and LDAF Section 319 Funds Expended in FFY2011 (October 2010-September 2011

4.0 Meeting NPS Milestones

The revised NPS Management Plan includes a set of tasks and a timeline to meet those tasks. Progress made on meeting these tasks will be reported in the FFY 2012 NPS Annual Report, following USEPA approval of the revised Plan. In 2005, LDEQ's Clean Waters Program (CWP) established quantifiable goals of restoring 25% of the state's impaired water bodies. As indicated in the 2010 IR, significant progress has been made in improving water quality and meeting these goals. Figures 2 and 3 indicate significant water quality improvements in primary contact recreation (PCR) and secondary contact recreation (SCR). Approximately 83% of the water bodies impaired for PCR have been restored and 97% of the water bodies impaired for SCR have also been restored. Approximately 33% of the water bodies impaired for Fish and Wildlife Propagation (FWP) have been fully restored. The draft 2011-2016 NPS Management Plan includes a new water quality goal to reduce NPS pollutants and improve water quality in 37 water bodies by October 2016.

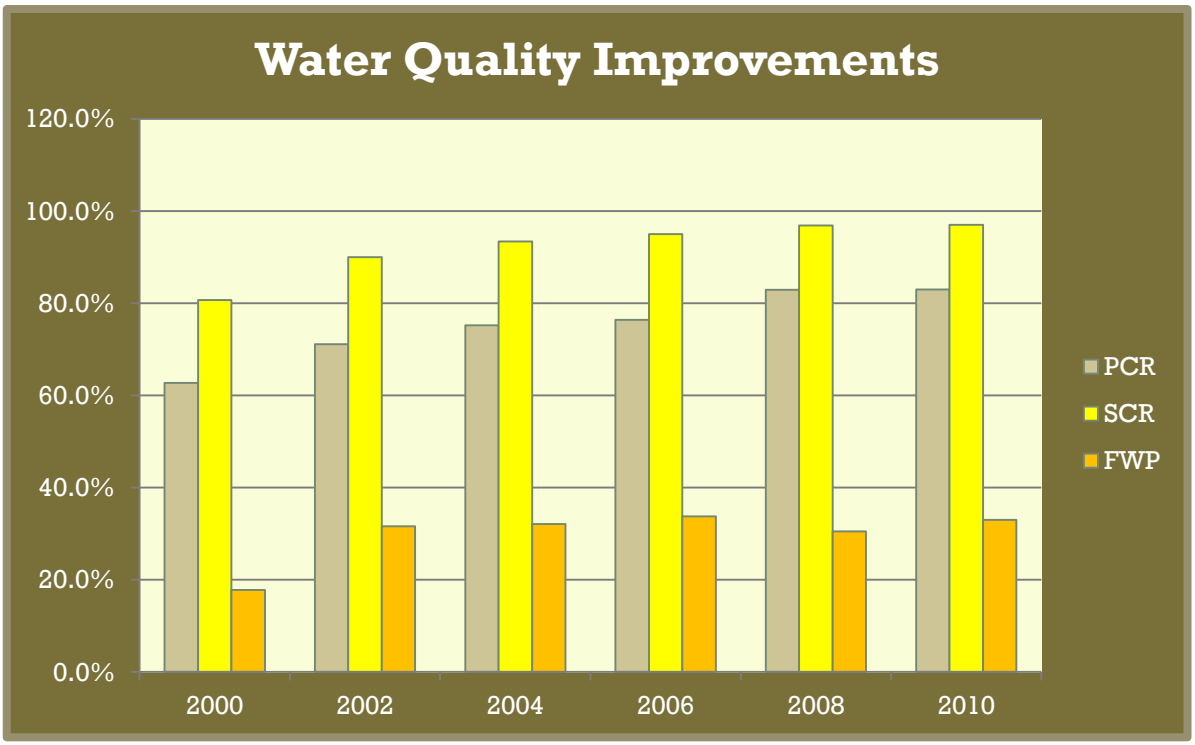


Figure 1 - Bar Chart of Water Quality Improvement between 2000 and 2010

Figures 2 and 3 illustrate watersheds in the state impaired for PCR and FWP, based on the 2010 IR. Water bodies impaired for low DO, high turbidity, TSS, total dissolved solids (TDS), nutrients and metals, including mercury are classified with FWP designated uses. As the NPS Program prioritizes which water bodies are primarily impaired for nonpoint pollutants, NPS staff and watershed coordinators focus on those water bodies with low DO or high concentrations of nutrients, fecal coliform, turbidity, TSS and TDS.

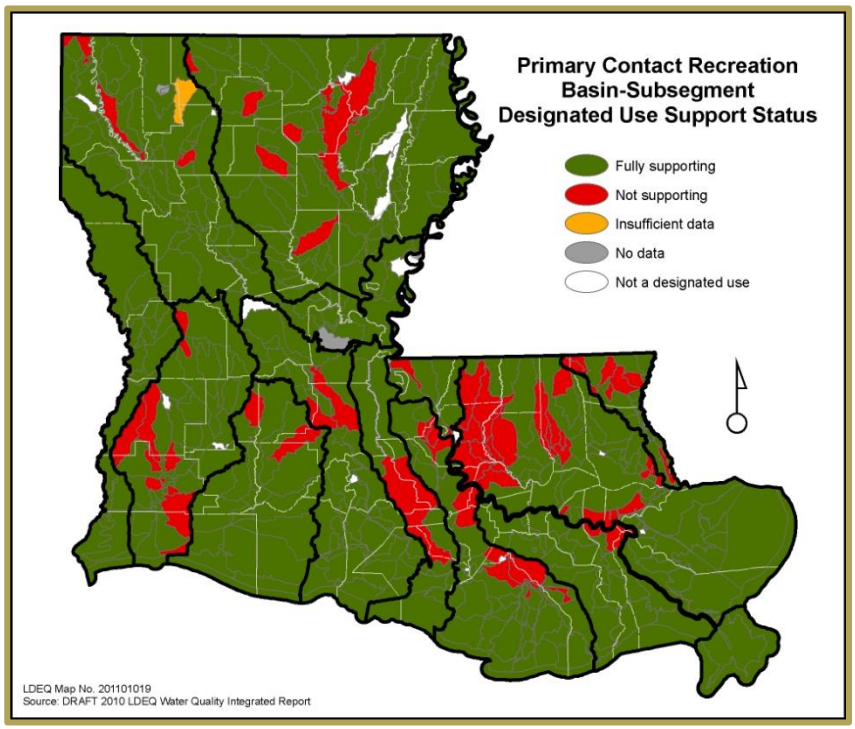
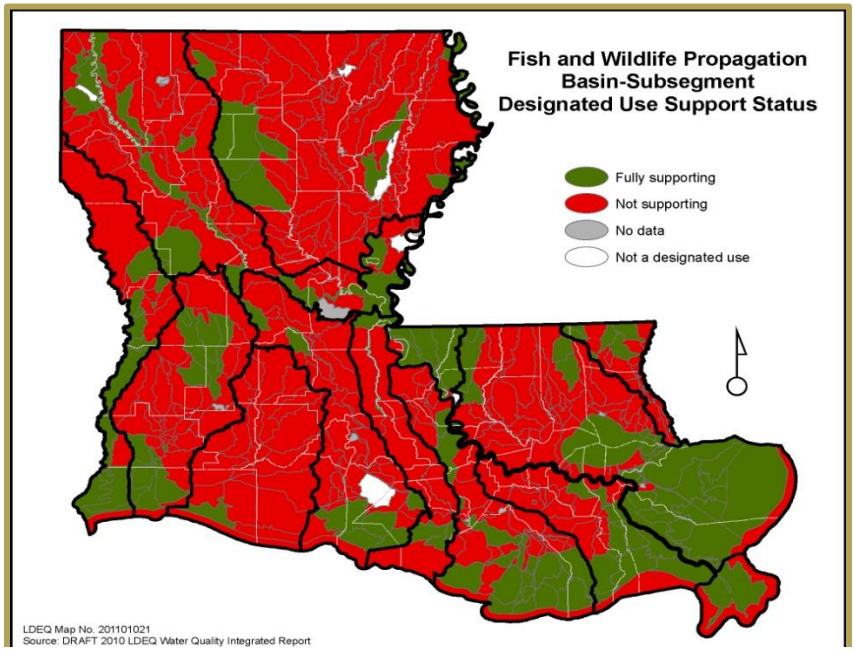


Figure 2 - Map of 2010 PCR Impaired Watersheds



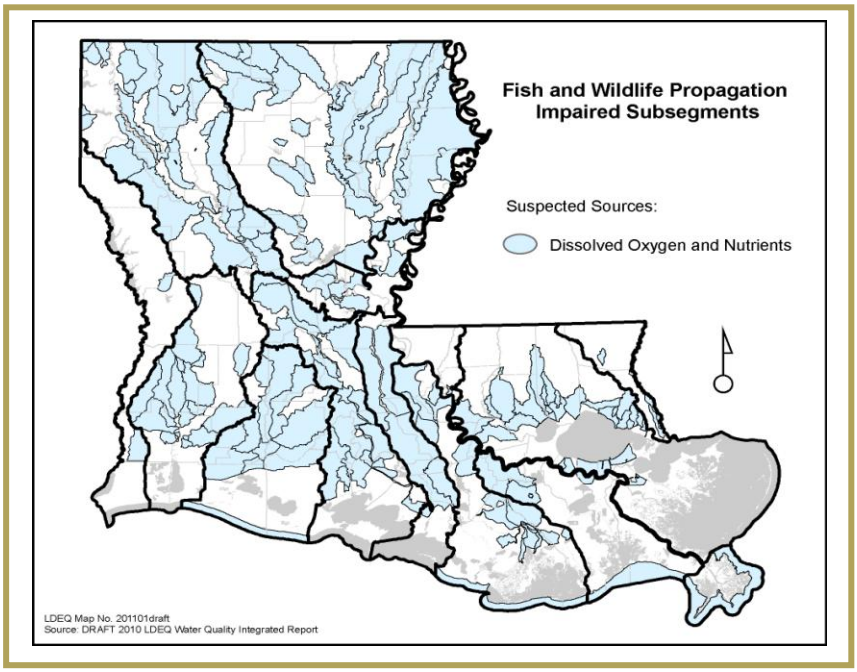


Figure 4 - Map of 2010 FWP Impaired Watersheds for Low DO and/or High Concentrations of Nutrients

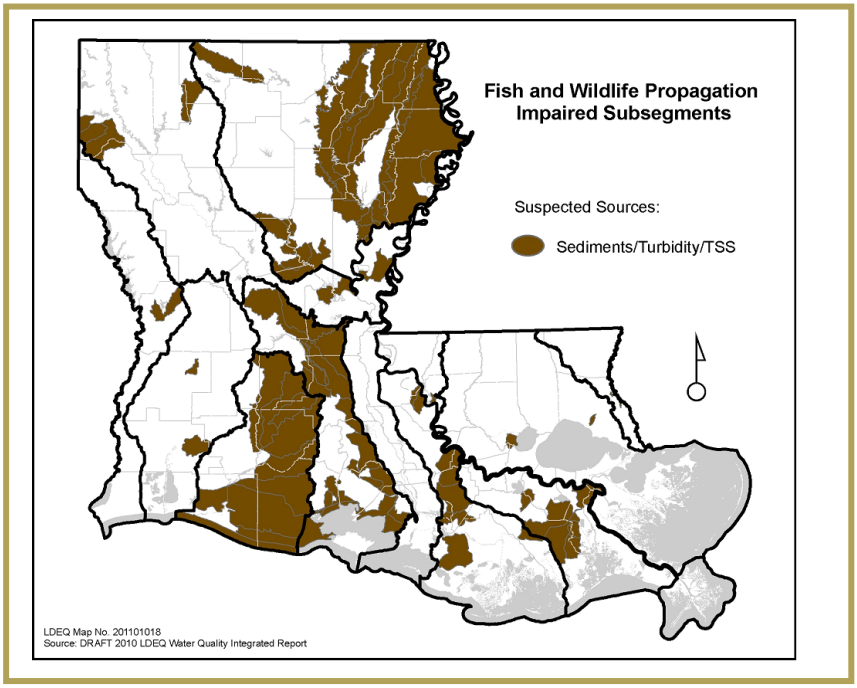


Figure 5 - Map of 2010 FWP Impaired Watersheds for Sediments/Turbidity/TSS

Figures 4 and 5 illustrate watersheds impaired for FWP because of low DO and/or high concentrations of sediment/turbidity/TSS, respectively.

LDEQ prioritized these watersheds for NPS implementation, with activities and projects described in the FFY 2011 NPS Annual Report as steps toward reducing the NPS impairments and partially or fully restoring water quality by 2016. LDEQ will continue to partner with LDAF and USDA to improve water quality in water bodies impaired by agricultural NPS pollutants (i.e. sediment, turbidity, fecal coliform bacteria, nutrients and low DO). Appendix A of the 2010 IR included approximately 45 subsegments impaired by sediments from agricultural activities, 21 by nutrients and 10 by fecal coliform bacteria from managed pastures or grazing lands. Appendix A of the 2010 IR included 47 subsegments with water quality impairments related to fecal coliform bacteria from individual home sewage treatment systems. LDEQ will partner with LDHH and local parishes to reduce these pollutants and improve water quality by 2016.

5.0 Statewide Watershed Planning and Implementation

Louisiana's NPS Program focused much of its efforts on watershed planning and implementation to reduce NPS pollution and improve water quality. This watershed management approach utilizes TMDLs combined with detailed land-use classification from satellite imagery and watershed characterization to target specific areas in the watershed where BMPs should be implemented. All TMDLs completed by LDEQ and USEPA are available at USEPA's website:
http://iaspub.epa.gov/tmdl_waters10/attains_impaired_waters.tmdls?p_state=LA

Implementation Plans Focused on in FFY 2011

Basin	Subsegment
Ouachita	Big Creek (080903)
Ouachita	Joe's Bayou (081002)
Ouachita	Tensas River (081201)
Ouachita	Lake St. Joseph (081202)
Vermilion-Teche	Vermilion River (060801,060802)
Vermilion-Teche	Bayou Teche (060301,060401)
Lake Pontchartrain	Ponchatoula Creek (040505)/ Yellow Water River (040504)
Lake Pontchartrain	Bogue Falaya River /Abita River (040804)
Red	Iatt Lake (101302)
Calcasieu	Marsh Bayou (030603)
Terrebonne	Upper Bayou Terrebonne (120301)
Sabine	Vinton Waterway (110601)
Ouachita	Dugdemona River (081401)

Table 3 - Watersheds and their respective basins in which a WIP was developed or revised

During FFY 2011, LDEQ's NPS staff continued their partnerships with watershed coordinators to revise or initiate 13 WIPs in Ouachita, Vermilion-Teche, Red, Mermentau, Terrebonne, Calcasieu, Sabine, and Lake Pontchartrain Basins. LDEQ's GIS staff completed detailed land-use classification for Vermilion-Teche Basin and is currently working on Ouachita River Basin.

Lake Pontchartrain Basin

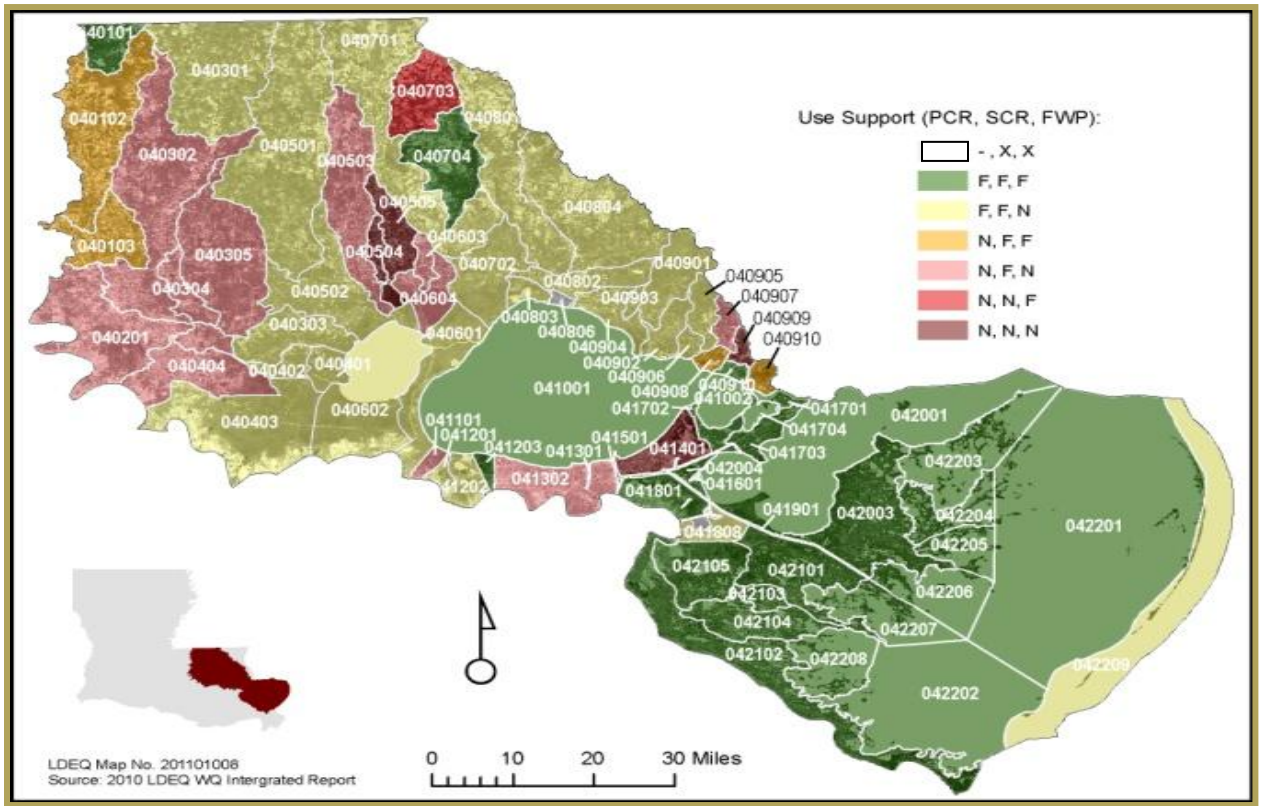


Figure 6 - Key for the above map is as follows: PCR-Primary Contact Recreation; SCR-Secondary Contact Recreation; FWP-Fish and Wildlife Propagation; F=Fully Supporting, N=Not Supporting

Appendix A of the state's 2010 IR included 35 NPS impaired water bodies in Lake Pontchartrain Basin. These NPS water quality impairments included low DO and high concentrations of fecal coliform bacteria, TSS and turbidity. Sources of these water quality impairments included site clearance for development or re-development, individual home sewage systems, drainage/filling/loss of wetlands and habitat modifications.

Appendix C of the state's 2010 IR indicated, 67 water bodies in Lake Pontchartrain Basin that have improved with delistings of mercury, fecal coliform bacteria, lead/copper, turbidity, nutrients and metals between 2004 and 2010.

Ponchatoula Creek and Yellow Water River Watershed Implementation Plan

Figure 7 - Bi-monthly stakeholder meeting

A WIP was developed in FFY2011 for Ponchatoula Creek (subsegment 040505) and Yellow Water River (subsegment 040504), located in Tangipahoa Parish, the fourth fastest growing parish in Louisiana. The state's 2010 IR indicates these watersheds are not meeting PCR, SCR and FWP designated uses due to fecal coliform bacteria, nitrate/nitrite, total phosphorus, TDS and low DO. TMDLs were developed by USEPA for this watershed for fecal coliform, DO and TDS and are currently available for public notice. Through bi-monthly meetings with the Tangipahoa Watershed Task Force in 2011, NPS pollutant sources were identified and prioritized for implementation.

Figure 8 - Water quality being tested on Yellow Water River.

In 2006, LPBF was awarded a USEPA Targeted Watershed Grant to identify sources of fecal coliform in Lake Pontchartrain Basin. LPBF implemented a water quality monitoring program with 37 sites, sampled bi-weekly across Tangipahoa Parish. There were 1451 samples collected in Ponchatoula Creek and Yellow Water River watersheds through this targeted monitoring program. Analysis of these samples indicated high pollution concentrations, resulting in an additional three (3) years of Section 319 funds allocated for weekly sampling at 10 to 16 sites. These sites are in urbanized areas of the parish and the data will be utilized to identify critical areas and to evaluate effectiveness of existing and future BMP implementation. In 2011, to reduce fecal coliform in these watersheds, LDEQ's watershed coordinator in Capital RC&D met with Sewer District No. 1 of Tangipahoa Parish and parish officials to plan and implement additional regionalization, wastewater operator training for municipal systems, and home sewage inspections for individual home sewage systems.

More than 50% of these watersheds consist of deciduous and evergreen forests and a small portion of forested wetlands that are located near the confluence of the two watersheds. Approximately 18% of these watersheds consist of agricultural land, such as pasture, hay production, strawberry farms, cattle, and other small animal farms. In 2012, the watershed coordinator will begin utilizing water quality sampling data to determine critical areas to implement BMPs recommended through watershed stakeholder meetings.

The remaining 28% of the watershed is increasingly urbanized with densely populated areas, characterized by impervious surfaces that result in higher stormwater discharge rates during heavy rainfall events. In 2011, the watershed coordinator partnered with local

governments to develop and adopt construction ordinances, green infrastructure technology and educational outreach for citizens on BMP implementation to reduce stormwater runoff. For many years, modifications have been made to natural hydrology by channelizing water bodies and removing riparian vegetation in an effort to reduce flooding. In 2012, the watershed coordinator will partner with LDEQ, US Army Corps of Engineers (USACE) and the parish drainage district to develop new strategies that should prevent further degradation of riparian areas and water quality restoration.

Figure 9 - Sampling performed by LPBF staff

Bogue Falaya River and Abita River Watershed Implementation Plan

In FFY 2011, LPBF watershed coordinator developed a WIP for Bogue Falaya (subsegment 040802) and Abita (subsegment 040804) Rivers. Plan development began in 2009 with extensive water quality monitoring and pollution source tracking activities. LPBF partnered with state and local agencies to identify pollution issues in these watersheds. Historical water quality monitoring, extensive GIS mapping and analysis, and a watershed model were utilized to quantify NPS loads to these waterways and to recommend potential solutions to reduce NPS loads. Wastewater from individual commercial and home sewage systems were identified as the largest contributors to water quality problems and the lower Abita River was identified as a critical area in the watershed for NPS implementation activities.

LPBF coordinator initiated extensive water quality monitoring in 2010 to evaluate current water quality conditions and track progress in watershed implementation. Ten (10) sites were sampled bi-weekly for water temperature, DO, specific conductance, pH, and turbidity and grab samples for fecal coliform, *E. coli* bacteria, NH_4/NH_3, NO_2-, NO_3-, total nitrogen (TN), total organic carbon (TOC), total inorganic carbon (TIC), total phosphorus (TP) and alkalinity. Water quality monitoring data indicates high pollutant levels in lower Abita River mirroring findings of the WIP and providing baseline data from which to evaluate water quality improvements.

In late 2011, LPBF chose the Natalbany River as its next WIP, based on water quality results from a NPS 319 project. In 2011, 440 samples were collected on Natalbany River, Ponchatoula Creek, Yellow Water River, Tangipahoa River, and Tickfaw River to identify priority areas for BMP implementation. Bacterial and nutrient parameters will be analyzed for Natalbany River, as they have been for Bogue Falaya and Abita Rivers through a cooperative agreement with Southeastern University of Louisiana (SLU) Microbiology Laboratory. Currently, water quality data indicates high concentrations of turbidity, alkalinity, NH4/NH3, NO2-, NO3-, TP, and fecal coliform bacteria in Yellow Water River and Ponchatoula Creek. A WIP was developed for these tributaries and will begin to be implemented in 2012. Water quality improvements that result from the work in Yellow

Water River and Ponchatoula Creek will be beneficial to watershed planning efforts for Natalbany River.

AerWay's No Till and Pasture Renovators Used on Highly Erodible Lands in Multiple Parishes

Capital RC&D coordinator secured Section 319 funds to address soil erosion from highly erodible lands in Lake Pontchartrain Basin. In St. Helena, East Baton Rouge, East Feliciana, West Feliciana and Tangipahoa parishes, three (3) AerWay Aeration Systems were purchased for a rental program established through a local co-op. The AerWay reduces agricultural NPS pollutants by retaining sediment and nutrients on highly erodible lands. The equipment broadcasts seeds on sloping lands, eliminating tillage of the soil. During 2011, eight (8) rentals were used on 219 acres in Tangipahoa and Tchefuncte River Watersheds resulting in 6570 pounds of nitrogen and 4730 pounds of phosphorus and potassium being retained on-site rather than entering receiving water bodies.

Figure 10 - Stakeholders with two renovators utilized in the project area

In St. Helena, Washington, St. Tammany and Tangipahoa parishes, four (4) renovators were purchased and placed at local co-ops for use by approximately 30 landowners through a rental program. The renovator breaks or fractures soil hard pans allowing higher water infiltration rates and more efficient utilization of fertilizer. In 2011, utilization of the renovator resulted in a reduction of 8235 pounds of nitrogen and 5929 pounds of phosphorus and potassium from entering receiving water bodies.

Benefits of Stream Corridor Protection

- **Channel protection of a stream is the "backbone" of a watershed.**
- **Reduce development in the most vulnerable areas; flood zones.**
- **Prevents a natural stream from becoming a degraded and hazardous drainage canal, prevents further drainage ditch discharge into the stream.**
- **Protects stream banks from erosion, reduces sedimentation and water quality problems, increases shade along stream banks to reduce temperature.**
- **Protects integrity of the main River.**
- **Improves water quality for recreation, fish and wildlife and environmental health.**

A Green Infrastructure Approach to Managing Stormwater & NPS Pollution on the Tangipahoa and Tchefuncte Rivers

The Land Trust of Southeast Louisiana's (LTSL's) mission is to conserve and protect valuable natural areas and agricultural lands of southeast Louisiana for current and future generations, by working with land owners. LDEQ partnered with LTSL on a two-phased project, employing a green infrastructure approach with local landowners, to develop site-specific action plans for demonstration projects to reduce negative impacts of stormwater in Tangipahoa and Tchefuncte watersheds, protecting critical buffer zones and stream corridors.

In early 2011, lands adjacent to these water bodies were identified and analyzed as potential project sites. An analysis of stakeholders and an educational outreach plan for stakeholders and partners in Tangipahoa and Tchefuncte watersheds have been completed. Watershed task force meetings targeted land adjacent to these rivers and their tributaries for preservation and/or restoration. Task force meetings will continue in 2012. Through these taskforce meetings, Skull's Creek and Abita/Bogue Falaya River stream corridors have been identified as possible project areas.

Recent drainage and clearing activities and water quality

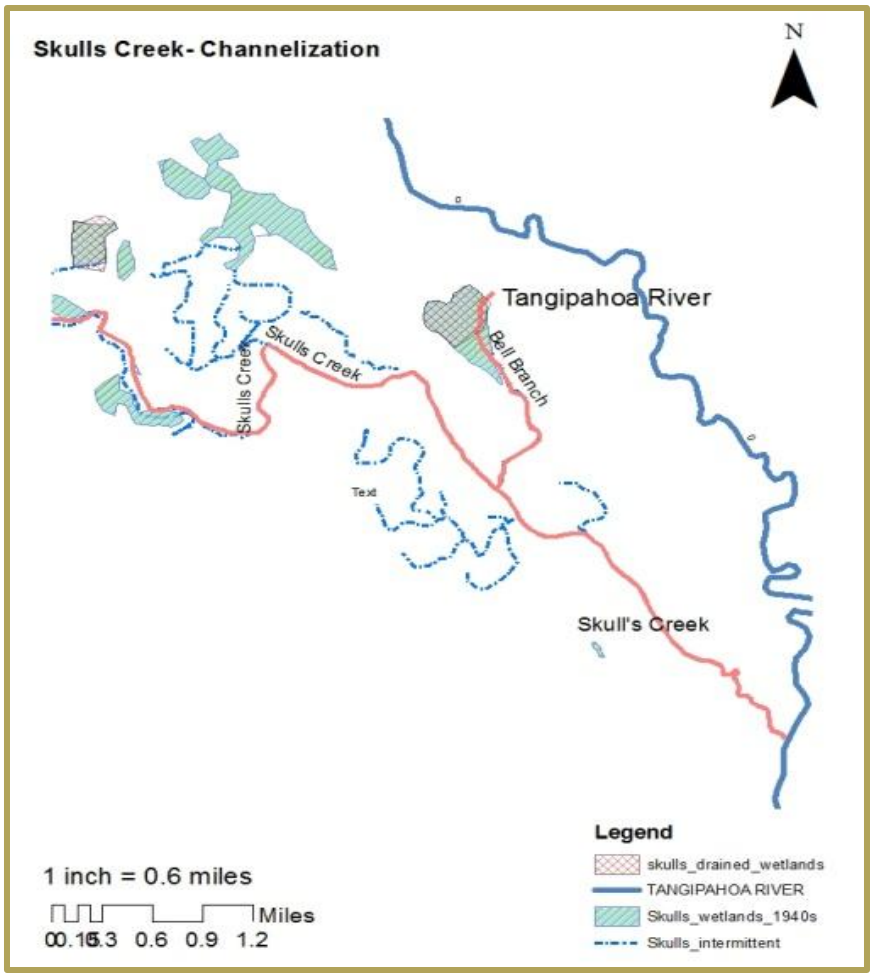


Figure 11- Map of Skull's Creek's hydromodification

data have indicated degraded conditions. Stream bank defoliation, clearing and snagging for drainage improvements occurred in Skull's Creek as recently as January 2011, and occurred with some frequency throughout Tangipahoa River Watershed, resulting in unstable stream banks. One goal of this project is to permanently protect a 350 ft. buffer along each side of the stream bank for future stream restoration.

Increased development since Hurricane Katrina along Abita and Bogue Falaya Rivers has contributed to increased urban runoff to Tchefuncte River tributaries. Another goal of the project is to secure easement agreements in an old established area of the watershed with large degraded riparian zones for riparian restoration. Various workshops including green infrastructure demonstration site workshops are being planned for 2012.

Water Quality Monitoring and Education in North Shore Watersheds

On January 1, 2011, LPBF initiated a three (3) year project to locate and evaluate pollution sources in north shore watersheds through water quality data collection and land-use analyses. They also implemented a program to assist small wastewater treatment plant operators to improve their compliance with permit requirements. A general educational outreach program was also implemented through partnerships with state and local governments on environmental pollution issues. This project is being implemented in Tangipahoa parish watersheds, with a goal to reduce the concentration of fecal coliform and *E.coli* bacteria by 25% in water bodies with high bacterial levels. As individual home sewage systems and other sources of bacteria are reduced, nutrient concentrations may also be reduced.

LPBF also conducted weekly water quality monitoring at multiple sites in north shore watersheds, documenting water quality conditions, identifying critical areas and evaluating improvements. Approximately 440 samples were collected on Natalbany River and its tributaries, and also on Tangipahoa and Tickfaw Rivers to identify critical areas of NPS pollutant loads. LPBF has investigated pollution sources, utilizing water quality and land-use data. LPBF referred over 80 point source dischargers to LDEQ's Small Business/Community Assistance Program and coordinated with LDEQ's NPS group on educational outreach assistance. The Tangipahoa Task Force, a multi-agency coalition met bi-monthly in 2011 and discussed progress of the project, as well as the Ponchatoula and Yellow Water Rivers WIP. In late 2011, LPBF began working on a WIP for Natalbany River and will, continue water quality monitoring and source tracking activities in 2012.

Source Water Protection Program in Tangipahoa Parish

In June 2011, the SWPP staff formed a stakeholder group in Tangipahoa parish with representatives of local water systems and local government officials to assist in protecting local drinking water sources. Tangipahoa parish has 38 active public community ground water systems.

On June 23, 2011, a community meeting was held in the City of Hammond to educate the public and invite volunteers to form a parish drinking water protection committee. Several attendees volunteered to participate on the committee to partner with LDEQ on projects to protect their drinking water. The first committee meeting was held on July 28, 2011 to

discuss future activities and local issues involved in drinking water protection. The Village of Tickfaw adopted a drinking water protection ordinance on August 9, 2011. A second committee meeting was held on August 25, 2011 to train committee members on how to conduct educational outreach activities for owners or operators of potential sources of contamination and how to update source water assessments. A third committee meeting was held on September 22, 2011, to discuss the drinking water protection ordinance and educational topics of interest.

On September 26, 2011, SWPP staff attended the Tangipahoa Parish Council and Town of Independence Council meetings to present an example of a drinking water protection ordinance for consideration. The staff met with and assisted several water system operators in developing contingency plans. The staff also presented the drinking water protection program to the City of Hammond Kiwanis Club and the Town of Ponchatoula Kiwanis and Rotary Clubs.

In 2012, the SWPP staff will continue drinking water protection efforts in Tangipahoa parish, including educational visits to owners and operators of potential sources of contamination, promotion of the ground water protection ordinance, and development of contingency plans for water systems.

Ouachita River Basin

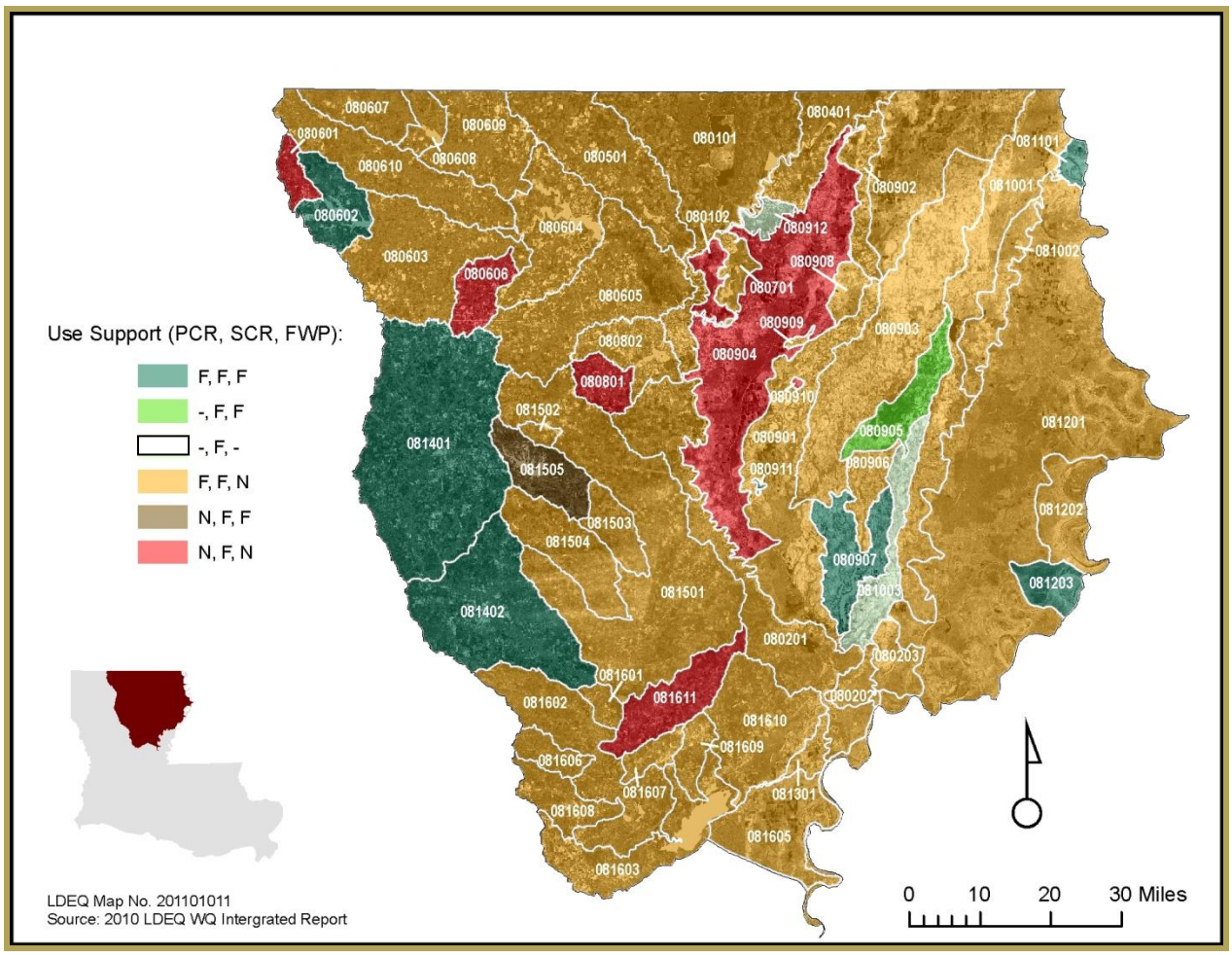


Figure 12 - Key for the above map is as follows: PCR-Primary Contact Recreation; SCR-Secondary Contact Recreation; FWP-Fish and Wildlife Propagation; F=Fully Supporting, N=Not Supporting

Appendix A of the state's 2010 IR identified 28 NPS impaired water bodies in Ouachita River Basin. These NPS impairments include low DO, high concentrations of fecal coliform, TSS, turbidity, sedimentation and siltation, pesticides, nutrients and metals. Sources of these water quality impairments included irrigated and non-irrigated crop production, silvicultural activities such as harvesting and individual home sewage systems.

Appendix C of the state's 2010 IR included 14 water bodies in Ouachita River Basin that have improved, with delistings of low DO, high concentrations of fecal coliform bacteria, nutrients, TSS, turbidity and pesticides between 2004 and 2010.

Lake St. Joseph Watershed Implementation Plan

In FFY 2011, the 2004 Lake St. Joseph (subsegment 081202) WIP was revised. Lake St. Joseph is an oxbow lake located in northeast Louisiana. According to the state's 2010 IR Lake St. Joseph is not meeting FWP for DO, nutrients, TSS and turbidity. A 2002 TMDL for DO and nutrients indicated that a 6% reduction in NPS loads was necessary to meet the state's DO water quality standard of 5 mg/L. A 2002 TMDL for TSS, turbidity and siltation indicated that a 70% reduction in TSS was necessary from January through June and a 33% reduction was necessary from July through December is needed to meet the standard. Appendix C of the 2010 IR indicated new data showed full attainment for DO and pesticides in 2004 and TDS in 2006. Ambient data in 2005 and 2006 indicated recurring standards violations for DO, so the focus of the WIP is to reduce nutrients, turbidity, TSS to improve DO. The major land-use is agricultural row crop production. The primary crops are cotton, corn, soybeans, grain sorghum and rice.

Figure 13 - Lake St. Joseph watershed tour

Figure 15 - Lake St. Joseph Task Force Meeting

A Lake St. Joseph taskforce has been established, which includes the Tensas-Concordia Soil Water Conservation District (SWCD), Natural Resources Conservation Service (NRCS), LDAF, Northeast Delta RC&D, local landowners and concerned citizens. It was pointed out by the taskforce that areas of the lake that were waist deep 35 years ago were currently only knee deep and other areas were now completely filled with sediment and could be walked across, demonstrating the significant increase in sediments in the lake. The taskforce also established BMPs for priority areas in the watershed.

Figure 16 - Lake St. Joseph's Producers Meeting

Figure 14 - LDEQ staff speaking at Lake St. Joseph's Task Force Meeting

The following ambient water quality data was collected at one site in Lake St. Joseph in 1999, 2005 and 2006:

Parameter	Standards and Guidelines	Ambient Water Quality Analysis
Dissolved Oxygen	State standard for Lake St. Joseph 5.0 mg/L	declined from 1999 to 2006 median values of 7.5mg/L in 1999 to 5.04 mg/L in 2006 consistently fell to 2.0 mg/L during summer months
Total Kjeldahl Nitrogen	N/A	fluctuated from 1999 to 2006, with highest mean of 2.595 mg/L in 2006 peak concentrations in Nov 1999, June & July 2005 and Jan 2006
Total Phosphorus	N/A	declined from 1999 to 2006, with median of 0.4 mg/L in 1999 to 0.315 mg/L in 2006 peak concentrations in Nov 1999, June 2005 and Aug 2006
Total Suspended Solids	USEPA TMDL guidelines 25mg/L Jan-June 33mg/L July-Dec	declined from 1999 to 2006, with mean of 45.4 mg/L in 1999 and 31.5 mg/L in 2006 peak concentrations in Nov 1999, March 2005 and Feb 2006
Turbidity	State guideline fresh water lakes 25 NTU	declined from 1999 to 2006, with mean of 47.5 NTU in 1999 and 33 in 2006 peak concentrations consistently occurred either Jan or Feb for all three (3) years of data collected peak concentration 150 NTU, but dropped to 75 NTU in 2005 and 85 NTU in 2006
Total Organic Carbon	N/A	declined from 1999 to 2006 average median 9.6 mg/L in 1999 and 8.45 mg/L in 2006 data for TOC was only collected from Jan – April 2006
Total Dissolved Solids	State standard for Lake St. Joseph 150 mg/L	declined from 1999 to 2006 median concentrations of 152 mg/L in 1999, 97.35 mg/L in 2005 and 81.65 mg/L in 2006 peak concentrations in March 1999, Feb 2005, and Aug 2006 state standard was met or exceeded 8 times in 1999 and never in 2005 and 2006

Table 4 - Ambient water quality data was collected at one site in Lake St. Joseph in 1999, 2005 and 2006

A field survey indicated that land within the watershed tends to slope from east to west, implying that surface water runoff that enters the lake appears to come only from the east side of the watershed from lands closest to the Mississippi River. The northern part of the watershed is narrower and shallower than the central and southern parts due to siltation from agricultural land. Three (3) major inflow ditches were identified around the lake through which surface runoff enters. One of the largest inflow ditch "Grudge ditch" is nearly 20 feet wide, is lined by a narrow strip of trees and shrubs, and surrounded by agricultural land.

LDEQ's ambient water quality monitoring program has not included lakes since 2006; therefore, in 2011, LDEQ and LSU AgCenter partnered for a one (1) year monitoring project to sample eight (8) sites for water quality pollutants, types of vegetation cover, current land-use and to identify main drainage ditches that contribute NPS pollutions to the lake. This water quality data will be used as baseline water quality data to evaluate the effectiveness of implementation. The sampling will begin in early 2012.

To reduce NPS pollutants, particularly nutrients and sediment, BMPs will be implemented for agricultural row crop BMPs (i.e. multi-use drainage, row crops, conservation tillage, vegetated filter strip, and contour farming), urban BMPs (lawn, street, parking lot, and rooftop BMPs) and hydromodification BMPs. USDA and NRCS have provided cost share assistance for BMPs in the area through the Conservation Reserve Program (CRP) and WRP Farm Bill Programs. However, most of the BMPs were implemented outside the watershed

on lands not directly impacting water quality of the lake. LDAF plans to begin implementing BMPs in this watershed in 2012.

Figure 17 - Brushy Bayou Walnut Bayou WIT partner meeting in Tallulah

Brushy Bayou/Walnut Bayou Watershed Implementation Plan

The Tensas River Watershed has been a continuous focus of multi-agency team efforts of restoring bottomland hardwood forests and improving water quality. Louisiana has led the nation in acreage of bottomland hardwood forests restored by USDA's Wetland Reserve Program (WRP). Brushy and Walnut Bayous include 31.6 stream miles, consisting of 27,850 acres of agricultural land, forested wetlands and a portion of the City of Tallulah.

The two (2) year project to restore Brushy and Walnut bayous started in January 2011, through a cooperative agreement with Northeast Delta RC&D Council assembling a Watershed Implementation Team (WIT), consisting of the Mayor of Tallulah, USDA-NRCS, Louisiana State University (LSU) AgCenter, LDEQ, SWCD, LDAF, other agencies and citizens to assist the watershed coordinator with development of a WIP in 2012. The contractor, LDEQ and University of Louisiana at Monroe (ULM) selected five (5) water quality monitoring sites for water quality sampling which began in 2011 and will continue through 2012, providing water quality data to determine critical areas for BMP implementation and baseline data to evaluate effectiveness of BMP implementation.

Dugdemona River Watershed Implementation Plan

In FFY 2011, the Trailblazer RC&D watershed coordinator developed a WIP for Dugdemona River (subsegment 081402), located in Winn Parish. According to the state's 2008 IR, the river was not meeting PCR designated use due to fecal coliform bacteria from livestock and on-site sewage treatment systems. During development of the WIP, an error was discovered on the 2010 IR list which resulted in the impairment being delisted. The focus of the WIP was re-directed to preserve, protect and maintain a healthy watershed. In 2011, a stakeholder group which included Dugdemona SWCD was established to provide knowledge and insight of potential environmental areas to focus on, such as potential contamination from litter, pesticides, fertilizers, oil, sediment (from erosion) and toxic household or industrial chemicals.

Figure 18 - Carter's Crossing in Winn Parish

Land-use activities contributing to NPS water quality impairments include agriculture, forestry, urban runoff, construction, individual home sewage systems, resource extraction and hydromodification. Major land uses in the watershed include forests (63.4%), woody wetlands (15.9%), shrubs/scrubs (12.8%), urban areas (5.6%) and pasture/hay (1.1%). Forestry is the leading industry, which includes six (6) major timber companies and large mills that produce plywood, lumber, pulpwood chips and veneer. The Louisiana Forestry Association (LFA) sponsors the Sustainable Forestry Initiative (SFI) and encourages sustainable forestry, sound forest stewardship and commitment to conservation and the Master Logger Program that certifies trained loggers in implementing forestry BMPs.

Failing and failed sewage systems were the most likely cause of fecal coliform contamination in the watershed. Most of the communities living in this watershed are rural making it difficult to pin-point a specific area of contamination. Winn Parish has passed a planning ordinance requiring all new electrical connections and reconnections to provide proper sewer installation, thereby meeting the State Sanitary Code. Complaints can be filed with the Winn Parish Health Unit, which can result in a notice of violation, an informal conference, compliance order, fines and referrals to civil court in an effort to achieve compliance.

NPS BMPs identified in the watershed include acres of agricultural lands enrolled in NRCS's and Dugdemona SWCD's, on-site individual home sewage system inspection and enforcement, and BMPs for forestry and road construction. Currently, there are 2,470 acres of agricultural lands enrolled in NRCS programs (i.e. 450 acres in CRP, 1,200 acres in EQIP, 600 acres in CSP and 220 acres in WHIP) in the watershed.

The watershed coordinator and stakeholders conducted educational outreach and networking activities including 2,400 participants at the following locations and events: Project Wet Water Festival, Dugdemona SWCD Tree Sale, libraries, Police Jury meetings, local businesses, Dugdemona SWCD meetings, schools, 4-H program, Girl Scouts, Kiwanis Club and Dare Fair. In addition, press releases, brochures, posters and a large promotional photo contest have reached a larger population.

Tensas River Watershed Implementation Plan

The 2005 WIP was revised for the Tensas River (subsegment 081201) in 2011. The river is located in northeastern Louisiana in Ouachita River Basin and was included on the state's 2010 IR as not meeting FWP designated use due to carbofuran, toxaphene, DDT, low DO, high concentrations of TSS and turbidity from irrigated and non-irrigated crop production. A 2002 TMDL for DO and nutrients indicates that a 93% reduction in NPS loads was necessary to meet the state's water quality standards of 5 mg/L DO. A 2002 TMDL for sediments indicated that a 68% reduction in TSS is needed during wet seasons of the year to restore FWP designated uses. A 2003 TMDL for pesticides recommended routine monitoring to determine compliance with freshwater quality standards for a fish consumption advisory in place since 1992, when DDT and toxaphene were detected in fish tissue.

LDEQ's ambient water quality data is available from four (4) ambient water quality monitoring sites on the Tensas River, with varying periods of record from 1958-2009. This data indicates water quality standards for DO were largely maintained above 5.0 mg/L with occasional dips during summer months. With no numerical criteria established for TSS, the state's turbidity guideline is utilized to determine water quality. The water quality data indicates turbidity is high and frequently exceeds the state guideline of 50 NTU. On average, the data indicate nitrogen and phosphorus concentrations were highest from January through May, which could be associated with agriculture practices.

Figure 19 - Tensas River north of Judd Bayou, taken from west side of Tensas River facing northeast during LDEQ's Northeast Louisiana fly-over

Figure 20 - Sedimentation along the Tensas River

Figure 21 - Tensas River north of Big Bayou, taken from north side of the river facing southeast, during LDEQ's Northeast Louisiana fly-over

Critical areas in the watershed were selected based on land-use and water quality data. The area south of Lake Providence to Swan Lake has been identified as a critical area for reducing nutrients and sediment from forestry and agricultural activities, individual home sewage systems, and hydromodification.

Agriculture is the most prevalent land-use in the watershed, including crop production and pastureland. Agricultural BMPs will be focused on nutrients, pesticides, pasture, soil & water management and general farm BMPs. Forestry represents 22% of the land-use and contributes pesticides, herbicides, fertilizers, fire-retardant chemicals, organic matter and woody debris in the watershed. Recommended forestry BMPs include selective cutting, minimizing soil erosion on roads along roadsides and installing or retaining riparian buffers. Only a small portion of the watershed is in urban areas, with individual home sewage systems and stormwater runoff contributing pollutant loads to the river. Inspection of newly installed home sewage systems combined with lawn maintenance and landscaping BMPs were recommended to reduce NPS pollutants in this watershed. Educational outreach activities in the watershed about NPS pollution should help stakeholders understand steps they can take to protect the Tensas River. Implementation of these BMPs should result in NPS pollutant reductions and measurable water quality improvements, as required in the 2002 and 2003 TMDLs.

Upper Joe's Bayou Watershed Implementation Plan

In FFY 2011, LDEQ watershed coordinator at Northeast Delta RC&D revised the 2005 WIP for Upper Joe's Bayou (081002), located in northeast Louisiana in East Carroll Parish. According to the state's 2010 IR, Joe's Bayou is not meeting FWP designated use due to low DO and high concentrations of TSS, turbidity, carbofuran and DDT. The suspected sources of these impairments included irrigated and non-irrigated crop production. A 2002 TMDL for TSS, turbidity and siltation established fluvial erosion processes as a primary cause of suspended sediment and indicated a 74% NPS load reduction is needed to meet water quality

standards. Ambient water quality data from 1999 indicated turbidity values were greater than the state's recommended guideline of 50 NTU in all months except August. For TSS, a target value of 40 mg/L between January and June suggested turbidity and TSS could be causing more water quality problems than DO. Upper Joe's Bayou watershed consists of 90% cultivated crop land for cotton, corn, soybeans, rice, sorghum, and winter wheat.

The watershed coordinator developed partnerships with Upper Joe's Bayou Watershed Partnership, ULM, LDEQ, Lower Mississippi River Sub-Basin Committee on Hypoxia, Louisiana Master Farmer Program, LSU Ag-Center, local newspapers, National Wild Turkey Federation, USDA-NRCS, Ducks Unlimited, LDWF, USACE, Local Engineering Firms, USEPA Region 6, LDAF, Local Police Juries, Local SWCDs, and local land-users, producers, and citizens to help guide the watershed planning process and assist with BMP implementation and water quality monitoring.

The watershed coordinator, ULM and LDEQ developed a three-tiered water quality monitoring and evaluation process including in-stream and edge-of-field water quality monitoring to evaluate effectiveness of BMP implementation. ULM conducted sampling at five (5) sites for DO, pH, turbidity, temperature, conductivity, nutrients and solids from March 2010 – August 2011. Total phosphorus and orthophosphate levels were elevated at all sites for all sampling events. Turbidity, total solids, TSS and TDS levels were high from March to June and decreased in summer months from July – September. Water clarity improved during summer months.

Current sediment load calculations indicate approximately 24,721 tons of sediment enter the bayou each year. The goal is to reduce sediment loads from agricultural land to approximately 18,294 tons/year or 74%. Conventional cropping systems in the watershed result in an average soil loss of 3 to 7 tons/ac/yr. NRCS has determined approximately 5,753.11 acres of potentially highly erodible soils in the watershed. The total amount of nutrients calculated for each crop type during 2010 were determined by adding each of the loads per crop resulting in approximately 107,702 lbs/year of TN and 20,427 lbs/year of phosphorus transported from agriculture activities to the water body. The goal is to reduce nitrogen loads by 79,699 lbs/year or 74% and phosphorus loads by 15,116 lbs/year or 74%. In addition to current BMPs and practices implemented in the watershed, BMPs that follow NRCS' Conservation Systems Approach of avoiding, controlling, and trapping pollutants will be implemented in critical areas of the watershed.

Figure 22 - Upper Joe's Bayou limited resource/minority landowners meeting

Figure 23 - Upper Joe's Bayou, monitoring site 4

NPS Pollutant Reduction in the Tensas River Watershed using a Vegetated Filter Strip-Retention Pond System

The LSU AgCenter is focusing on the Tensas River watershed to reduce NPS pollutants such as nutrients (phosphorus and nitrogen) and sediment at strategic locations in Tensas River Watershed. The goal of the project is to treat surface runoff from more than 570 acres of intensive agricultural land that drains to the river.

The project will consist of a vegetated filter strip (approximately 8 square acres of bermuda grass) and an existing retention pond (with native aquatic plants) adjacent to the filter strip. The design is intended to channel the agricultural runoff from surrounding agricultural fields through the vegetated filter strip. The water will flow through the width of the filter strip, allowing filtration to occur, and be channeled to the retention pond for further pollutant removal. Control structures will be established at the outlet of the pond to regulate the discharge of water. The treated water from the pond will be discharged to a bayou that drains to Tensas River.

In 2011, LSU AgCenter initiated development of the QAPP. Implementation of the bermuda grass filter strip and associated water quality monitoring and analysis is scheduled to occur in early 2012.

GIS Land-Use Classification for WIPs in the Ouachita River Basin

In 2011, LDEQ contracted with two satellite imagery classification experts to develop an accurate crop specific land-use database and map of Ouachita River Basin. The data and maps provide information for development and implementation of WIPs. The field work was completed in the summer of 2011, and data analysis is expected to be completed in early 2012, with map development expected by spring-summer 2012. The final report and land-use map will be available on LDEQ's NPS website by summer 2012.

MRBI Monitoring Project located in the Ouachita River Basin

In FFYs 2010 through 2013, USDA has allocated approximately $80 million in federal funds for twelve states in the Mississippi River Basin Initiative (MRBI) to implement BMPs to address nutrient loads affecting local and gulf coast waters. In Ouachita River Basin, seven (7) 12-digit HUCs were selected through MRBI, including Crew Lake, Steep Bayou and Halfway Bayou in Bayou Lafourche (subsegment 080904) and Turkey Creek, Little Turkey Creek, West Turkey Creek and Turkey Creek Lake in Turkey Creek (subsegment 080906).

Turkey Creek was listed on the state's 2010 IR as not meeting the FWP designated use due to low DO because of NPS pollutants from row crop agriculture. A 2002 TMDL for biochemical oxygen-demanding substances and nutrients oxygen demanding substances indicates a 90% reduction in NPS to meet the water quality standards for DO. A 2002 TMDL for TSS, turbidity and siltation for Boeuf River indicates turbidity needs to be reduced 64% from January through June and 25% from July through December and TSS needs to be reduced by 67% from January through June and 42% from July through December in order to meet standards. A 2002 TMDL for fecal coliform indicates that an 86.6% reduction from May

through October is needed to meet PCR designated use and a 56% reduction from November through April is needed to meet SCR designated use. A 2010 TMDL for fecal coliform indicates a 49% reduction is needed during the winter and no recent reduction during the summer is needed to meet water quality standards.

Since 2004, USDA has provided cost share assistance for BMP implementation in this watershed through Environmental Quality Incentives Program (EQIP), CRP and WRP Farm Bill Programs. LDEQ prioritized Turkey Creek for development of a WIP and is partnering with Franklin Parish Police Jury and other stakeholders on a hydromodification project. Federal funds provided by Louisiana's Office of Community Development through Hurricanes Gustav/Ike recovery program have been leveraged with CWA Section 319 funds for BMP implementation and in-stream water quality monitoring. Annual average values of NO_2/NO_3, turbidity, TSS and TP have declined and DO concentrations have improved between 2005 and 2007/2008.

Bayou Lafourche is listed on the state's 2010 IR as not meeting PCR and FWP due to high levels of TSS, turbidity, fecal coliform, 2,3,7,8 tetrachlorodibenzo-*p*-dioxin, 2,3,7,8 tetrachlorodibenzofuran and low DO with suspected sources of these pollutants including crop production, rangeland grazing, sewage discharges and industrial point sources. A 2002 TMDL for DO, turbidity and TSS indicates that an 81% reduction in NPS pollutants was necessary to meet the water quality standard for DO, Similarly, a 67% reduction in TSS was necessary between January and June, and a 32% reduction was necessary between July and December to meet the water quality target established by USEPA for TSS. In 2006, LDEQ partnered with USDA Agriculture Research Service (ARS) to develop a WIP for Bayou Lafourche. USDA-ARS utilized the Annual Agriculture and Nonpoint Source (AnnAGNPS) watershed model to target where in the watershed NPS load reductions could be achieved. The results indicated that by converting 25% of highly erodible lands to grasslands through CREP, TSS could be reduced by 88%. USDA and LDAF prioritized Bayou Lafourche watershed for CREP cost-share programs for BMP implementation between 2005 through 2008. During those three (3) years, approximately 49,897 acres of highly erodible lands were taken out of production through CRP or other BMP cost-share programs. Again in 2011, LDAF implemented a BMP cost-share assistance program within this watershed and evaluated BMP effectiveness with edge-of-field water quality sampling by ULM. Edge-of-field sampling will continue into the 2012 planting season. LDEQ's ambient water quality data for Bayou Lafourche indicates improvement since 1999:

Parameter	1999 Avg. Annual Conc.	2008/2009 Avg. Annual Conc.
Dissolved Oxygen (DO)	6.275 mg/L	7.24 mg/L
Total Kjheldahl Nitrogen (TKN)	0.981 mg/L	0.933 mg/L
Total Suspended Solids (TSS)	68,209 mg/L	47.33 mg/L
Total Dissolved Solids (TDS)	357.73 mg/L	281.583 mg/L

Table 5 - Ambient water quality data for Bayou Lafourche

Data for NO_2/NO_3 and TP did not improve between 1999 and 2008/2009 with peak concentrations in April, June and October 2008/2009.

LDEQ is in the process of finalizing a cooperative agreement with ULM to provide support for in-stream water quality monitoring for the 12-digit HUCs in Turkey Creek and Bayou Lafourche. In December 2011, LDEQ partnered with LDAF, NRCS, Northeast Delta RC&D, SWCDs and ULM to complete field reconnaissance for selection of appropriate sampling sites. These sampling sites have been incorporated into the QAPP for the project that is currently in review at LDEQ. Water quality sampling is expected to begin by February, 2012 for Bayou Lafourche and in March or April for Turkey Creek.

The baseline water quality data collected in both sub-segments will be analyzed to evaluate effectiveness of BMPs in reducing nutrients and sediment. This data will be evaluated with edge-of-field data collected by farmers participating in cost-share programs, funded by USDA.

Hydromodification Projects in Ouachita

LDEQ provided recommendations on several hydromodification projects in Ouachita River Basin, designed to remove storm debris and fallen trees in streams, bayous and rivers. LDEQ either had conference calls or met with the parish policy jury and their consulting engineers, followed by written comments on the types of BMPs that could be included in these projects to prevent NPS pollutants and protect fish habitat. Turkey Creek watershed is the pilot project to develop a template for how these projects could be implemented to protect further degradation and also provide local flood protection for landowners and the communities in the watershed. These water bodies included:

- Castor Creek (081501)
- Turkey Creek (080906)
- Bayou Lacombe and small drainages in the towns of Hessmer and Mansura
- Boggy Bayou (081201)
- Elm Slough (081301 and 081610)
- Sicily Island – Hooter Bayou (080203)

Identification and Reduction of NPS Pollutants to Bayou Desiard

Bayou Desiard and Lake Bartholomew (subsegment 080701) flow through the City of Monroe in northeast Louisiana. Subsegment 080701 is listed on the state's 2010 IR as not meeting FWP for low DO and mercury in fish tissue. Primary land uses in these watersheds include forestry and agriculture. Higher population densities and urbanized areas are located near Monroe. Currently, no wastewater facilities discharge to the bayou, but it receives a variety of NPS pollutants from stormwater runoff associated with adjacent homes, businesses, recreational areas, agricultural and pasture lands. The bayou is one of several drinking water sources for Monroe. The goal is to identify specific sources of NPS pollutant loads to the bayou and implement BMPs to improve water quality. The project was initiated in 2009 and is scheduled for completion on July 31, 2012.

From October 2010 to September 2011, six (6) sampling events were conducted at 12 sites to complete baseline water quality data along Bayou Desiard. Generally, ortho-phosphorus levels were elevated at all sites for all sampling events. Similarly, elevated levels of turbidity and TSS occurred during rain events, most notably in drainage ditches receiving agricultural runoff. Very high levels of fecal coliform bacteria were observed at several discharge sites during rain events, especially in storm drains located at ULM. Follow-up sampling in these storm drains revealed high bacteria levels coming from dormitory septic systems and adjacent parking lots. A test for *E. coli* bacteria was conducted on samples from these sites and the results were positive. As a result, several sites were identified for potential BMP implementation. During FFY 2011, at a bayou clean-up day, NPS pollution brochures were distributed at homes and businesses, storm drains were marked, drinking water protection signs were installed and a conceptual for recreating a rain garden BMP was discussed.

In 2012, ULM will construct the rain garden on campus to capture stormwater runoff from parking lots and campus dormitories which currently drain directly to the bayou. This project will serve as a demonstration and educational tool on urban NPS pollution for commercial and residential areas in the watershed. In collaboration with NRCS and LDAF, ULM will assist agricultural communities in the Bayou Desiard watershed to implement agricultural BMPs.

Lexington Elementary Environmental Education Wetland/Control of NPS Pollutants from Facility Runoff

Construction of Lexington Elementary Environmental Education Wetland in Monroe began in 2010 and was completed March 18, 2011. The goal of the project was to produce an outdoor environmental teaching facility that also reduced NPS pollutant loads and stormwater runoff. The outdoor constructed wetland/rain garden receives runoff and pollutants from the school yard and the 36,000 square-foot school building, removing these pollutants from Bayou Desiard. This project connects students to their natural environment by teaching them how to have a positive impact on water resources. Runoff from the roof is now directed through scuppers and into cisterns, where it flows to the wetland area and is used for organic gardening around the campus. Now named the W.O.N.D.E.R. Lab, the project has received praise from the students, parents, teachers, community leaders and community.

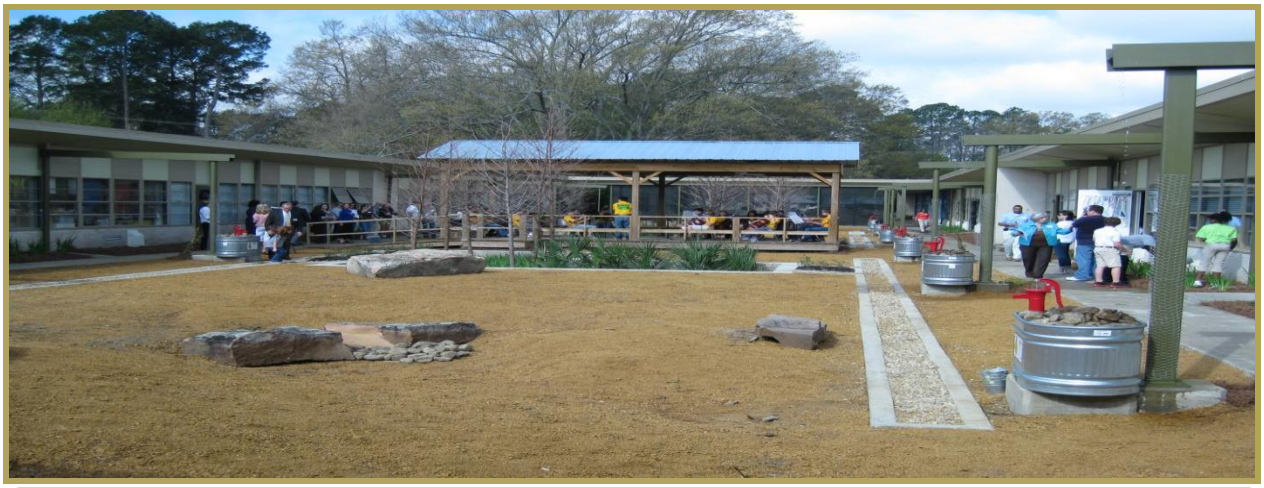


Figure 24 - The Lexington Elementary School "W.O.N.D.E.R." Lab

Hydrologic and Water Quality Response to River Reintroduction in Restored Bottomland Hardwood Forests of Upper Ouachita River Watershed

The Nature Conservancy (Conservancy) and U. S. Fish and Wildlife Service (USFWS) have partnered to implement an excellent opportunity to take floodplain restoration and reconnection to a significant scale on the Mollicy Farms Unit of Upper Ouachita National Wildlife Refuge, located in northeastern Louisiana. One goal of the project is reduction of nutrients and sediment exported to the Ouachita River and to increase ecosystem productivity, resulting from re-establishment of floodplain functions and processes.

Figure 25 – Ariel view of Mollicy Farms

A 2002 TMDL completed for Upper Ouachita River indicated a 30% reduction in NPS pollutants was necessary to fully support the FWP designated use. A 2006 Ouachita River WIP indicated that the Mollicy Farms project site is subject to high erosion rates which contribute from 0.006 – 1.5 tons/acre/year of sediment to the Ouachita River. The AnnAGNPS model also indicated that Mollicy Farm had a very high water yield (i.e. runoff of water) at 3.5 – 14.2 inches/acre/year. This modeling also indicated by returning agricultural lands to forests would reduce NPS pollution from the project site by ~85%.

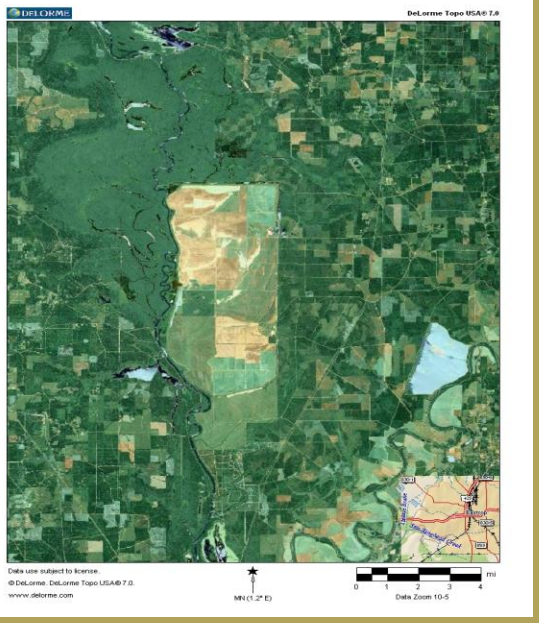


Figure 26 - Ariel view of Mollicy project area

Starting in 1969, as Mollicy Farms was cleared for row crop agriculture, 17 miles of levee was constructed around 16,000 acres to reduce flooding. Modifications to interior drainages disconnected the floodplain from the Ouachita River, resulting in a closed system. This agriculture conversion cut-off natural flooding patterns of seasonal flood pulses, resulting in water quality degradation and reduced productivity.

In the early 1990's, USFWS began acquisition of these agricultural lands for inclusion within the refuge, purchasing the last parcel by 2010.

From 1998 through 2001, USFWS reforested over 11,000 acres of bottomland hardwood species making Mollicy Farms one of the nation's largest bottomland reforestation projects. These seedlings can now tolerate

significant flooding, resulting from reconnection of the former floodplain and enhancing bottomland hardwood productivity to improve nutrient and sediment assimilative capacities through restoration of the natural hydrology.

Figure 27 - Water quality monitoring on the Ouachita River

Historic high water conditions in 2009 resulted in two (2) uncontrolled levee breaches. In 2010, USFWS removed over 1.5 million cubic yards of dirt, creating four (4) additional breaches in the Ouachita River levees. This river reconnection project should minimize impacts to the river channel and water quality, while restoring flow to waterways and drainages previously disconnected from the river. Monitoring after these levee breaches suggests that the tail end of the flood pulse may release significant sediment and potential contaminants to the river. Reconnection of former watersheds and streams are expected to reduce sedimentation, improve water quality and restore functionality of the floodplain.

Figure 28 - Biological monitoring on the Ouachita River

In FFY 2011, the Conservancy began a three (3) year monitoring project within the Mollicy Farms unit and also in the intact forested western floodplain of the river, documenting water quality, ecosystem and biological responses to re-establishment of the flood pulse and restoration of internal waterways. A monitoring station established in the Ouachita River, approximately two (2) miles downstream from the site indicates sediment, oxidized nitrogen and soluble phosphorus has increased as water re-entered the river from Mollicy Farms, suggesting that flood recession is a time of significant release of these potential contaminants. The data collected in 2013 will be utilized to verify estimated sediment and nutrient load reductions, resulting from restoration of natural flooding and interior hydrology and will evaluate the effectiveness of the restoration as additional levee breaches and interior hydrology restoration continues.

In the long-term, it is anticipated that this floodplain restoration project will (1) provide significant flood retention from both Ouachita River backwater flooding as well as overbank flooding from project area tributaries; (2) reduce nutrients and sediments exported to Ouachita River-estimates suggest that more than 200 tons of nitrogen may be sequestered annually; (3) re-establish floodplain functions and processes lost due to levee construction; and (4) increase biological productivity of aquatic and forested wetland habitats.

Figure 29 - Construction of the 1000-ft-long breach at the Shiloh Creek site

The significant scale of the restoration will serve as a demonstration site for future floodplain reconnection and restoration projects throughout the Mississippi River Valley. This project may prove to be a successful management strategy for nutrient reduction in hypoxic gulf coast waters.

Source Water Protection Program in Lincoln, Tensas, Concordia and Morehouse Parishes

Lincoln parish has 20 active public community water systems. All of the systems are groundwater systems; three (3) are purchasing systems. In FFY 2011, the SWPP staff assisted the City of Ruston and the Towns of Simsboro, Choudrant, and Dubach in adopting ordinances to protect drinking water supplies. The SWPP team also coordinated with the Lincoln Parish Extension agent to address waste handling procedures on poultry farms located near public water wells. Farm Assist educational materials were distributed to poultry farms providing pollution prevention/nutrient management plans to implement as part of their operations.

Figure 30 - Concordia-Ferriday Water Issue. This is an example of what can go wrong.

The SWPP staff initially met with the Tensas-Concordia SWCD in September 2010 to assist and support their program goals, with the majority of the work completed in FFY 2011. Tensas parish has six (6) active public community water systems; three (3) surface water systems, one (1) ground water system and two (2) purchasing systems. Concordia parish has nine (9) active community water systems; six (6) ground water systems, one (1) surface water system and two (2) purchasing systems. In 2011, the SWCD provided assistance in Lake St. Joseph and Lake Bruin watersheds, both important drinking water and economic sources for Tensas parish. In September 2010, the SWCD officially voted to

participate in the SWPP. The SWPP staff, LDHH Central Region 6 Regional Engine er, LDHH Northeast Region 8 Regional Sanitarian and Franklin, Madison and Tensas Sanitarian Managers met with the SWCD, at their request, in November 2010 to present source water assessment data to Tensas and Concordia parishes. LDHH representatives answered individual home sewage system questions regarding camps around Lake Bruin. The SWPP staff provided environmental/drinking water protection information to the SWCD for a media campaign in the St. Joseph area newspaper. In addition, the SWCD committed to establishing an acceptable facility to collect used oil in Tensas Parish to provide further protection to ground and surface water.

Figure 31 - Lincoln SWP Committee

The SWPP staff compiled GPS locations for new wells, completed contingency plans for water systems located in Tensas and Concordia parishes and assisted the towns of Clayton, St. Joseph, Vidalia, Ridgecrest and the Concordia Parish Police Jury in the passage of ground water protection ordinances. In addition, the SWPP staff trained volunteers to conduct educational outreach to owners and operators of potential sources of contamination in Tensas parish. These volunteers completed 23 site visits during 2011.

Figure 32 - Morehouse Drinking Water Protection Team

During FFY 2011, SWPP staff also introduced the program to Morehouse parish local officials and each of the parish's 15 active ground water source public drinking water systems. The staff is currently assisting these drinking water systems with their contingency plans which will be completed in 2012. The model ordinance was presented to the Morehouse Parish Police Jury, the Bastrop City Council, and the Villages of Bonita, Collinston and Oak Ridge by SWPP staff. The SWPP staff also assisted Morehouse parish with required SWAP data updates for their water systems. A community meeting was held on September 1, 2011, in the City of Bastrop informing attendees about their drinking water quality and why and how to protect it. Volunteers are currently working with LDEQ on projects to protect drinking water sources in Morehouse parish.

In 2012, the SWPP staff will continue drinking water protection efforts in Morehouse parish, including educational visits to owners and operators of potential sources of contamination, promotion of the ground water protection ordinance, and development of contingency plans for water systems.

Terrebonne Basin

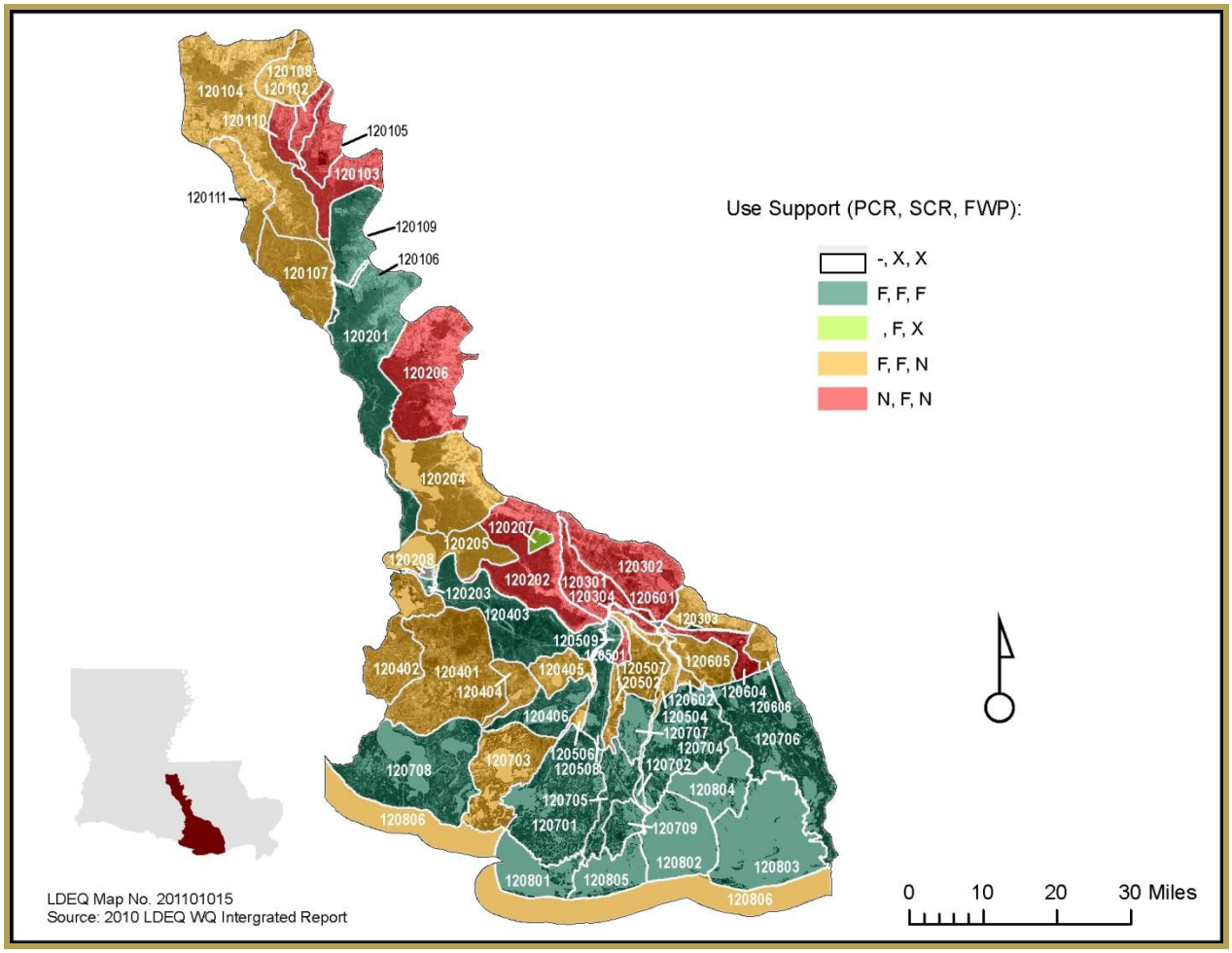


Figure 33 - Key for the above map is as follows: PCR-Primary Contact Recreation; SCR-Secondary Contact Recreation; FWP-Fish and Wildlife Propagation; F=Fully Supporting, N=Not Supporting

Appendix A of the state's 2010 IR identified 27 NPS impaired water bodies in Terrebonne Basin. These NPS water quality impairments included low DO and high concentrations of fecal coliform bacteria, TSS, TDS, sedimentation/siltation and turbidity. Sources of these water quality impairments included agricultural crop production, managed pastures, individual home sewage systems, site clearance from developed and redeveloped lands, total retention sewage lagoons and natural conditions.

Appendix C of the state's 2010 IR indicated 62 water bodies in Terrebonne Basin had improved with delistings for DO, nutrients, Oil & Grease, TDS, TSS, sedimentation/siltation and metals between 2004-2010.

Bayou Terrebonne Watershed Implementation Plan

Figure 34 - Bayou Terrebonne at Braves Bridge

Upper Bayou Terrebonne (subsegment 120301) located in southeast Louisiana was historically a tributary of Bayou Lafourche, which provided an important connection between the Mississippi River and the Gulf of Mexico. The bayou is now disconnected from Bayou Lafourche and primarily functions as a drainage conveyance for rainfall events, stormwater and sewage outfalls. In 2011, LDEQ's watershed coordinator partnered with stakeholders to host five (5) public taskforce meetings for identification of causes and sources of water quality impairment on Upper Bayou Terrebonne and potential solutions for those impairments.

The primary parameter of concern for Bayou Terrebonne was fecal coliform bacteria entering the bayou from unpermitted commercial and failing or failed individual home sewer systems. Louisiana's 2010 IR listed subsegment 120301 as not meeting PCR designated use due to high levels of fecal coliform bacteria. A 2006 TMDL recommended that a 95% load reduction of fecal coliform was necessary during recreational months of May through October. In 2011, LDEQ conducted a watershed sweep of the bayou, identifying unpermitted commercial systems and providing assistance for completion of permit applications. An edge of bayou field inspection was also conducted in 2011, identifying 176 individual PVC pipes with effluent draining directly to the bayou. In 2012, the watershed coordinator will partner with LDHH to identify all residents with individual home sewage system registrations. Educational programs are underway, providing information to homeowners on proper maintenance of individual home sewage systems. The watershed coordinator plans to partner with LDEQ, LDHH and the parish in drafting a plan for

Figure 35 - Bayou Terrebonne Planning Meeting

development of a systematic wastewater inspection and compliance strategy. Individual home sewer inspections are anticipated to begin in late 2012. The watershed coordinator will also work in 2012 to identify funding sources to assist homeowners with repairs of failings systems, replacement of failed systems, or connections to community systems.

Similarly, the state's 2010 IR listed this subsegment as not meeting the FWP designated use due to low levels of DO and high levels of nitrate/nitrite and phosphorus. A 2003 TMDL model indicated a 40% reduction in NPS loads is needed in northern reaches of the watershed that are predominately agricultural, and a 60% reduction is needed in lower reaches of the watershed that are more urbanized. Activities recommended in the WIP to reach these NPS load reductions, included: (1) removal of two remaining weirs (one was removed in 2009) that impede flow, allowing collection of pollutants up-stream; (2) re-vegetation of 80% of the riparian areas, planting mature trees in selective sites and reduction and eventual elimination of herbicide spraying; (3) work with Lafourche Terrebonne SWCD and landowners in 2012 to implement conservation farming and edge-of-field BMPs on agricultural fields which deliver sediment, fertilizer and pesticides to the bayou; and (4) work with Terrebonne Parish Consolidated Government and City of Thibodaux (two Multi-sector Separate Stormwater System (MS4) areas) to develop their MS4 stormwater management program, utilizing stormwater BMPs and smaller communities through educational outreach programs.

In FFY 2011, the watershed coordinator and LDEQ identified 16 sampling sites to monitor water quality bi-monthly for DO, fecal coliform bacteria, pH, specific conductance, salinity and temperature for a 12-month period and to identify critical areas for high concentrations of fecal coliform and to provide baseline data to compare future implementation. The QAPP has been approved by USEPA and water quality monitoring will begin in early 2012.

Upper Terrebonne Basin Initiative Tri-Parish Partnership

Upper Terrebonne Basin (UTB) is located between Atchafalaya Basin and Mississippi River levees in the middle of southern Louisiana. The UTB initiative was formed by the Tri-Parish Partnership (TTP) between Iberville, Pointe Coupee and West Baton Rouge parishes. The UTB is a part of Barataria-Terrebonne National Estuary Program (BTNEP) and Atchafalaya Basin National Heritage Trace. The partnership was formed to develop and implement solutions to resolve poor water quality, erosion, sedimentation, loss of fisheries and flooding problems. Several water bodies in the UTB have been identified as impaired and not meeting their designated uses.

LDNR funded the initial work to identify stakeholders and determine causes and sources of water quality impairments. The TPP funded the initiative to accurately identify and quantify the sources of these water quality problems. In FFY 2011, the TPP initiated a water quality monitoring program in the tri-parish watershed project area to monitor strategic locations or critical areas that would be included in the UTB WIP. They also identified implementation projects to improve water quality and source water in the basin.

The TPP identified lack of water flow and waterborne debris problems at several sites in the watershed. Several factors contribute to these water flow problems, but one of the major causes is an excessive amount of fallen trees in waterways. Bayou Grosse Tete is one of the

impaired waterways "clogged" by several fallen trees, preventing navigation, trapping excessive amounts of litter, and preventing water flow. In an effort to maintain a consistent flow in the bayous and reduce NPS loads, the TPP entered into a contract to remove fallen trees that span across the main channel of the bayou and others that cause flow obstructions.

3 parishes enter into agreement

Partnership centers on Atchafalaya East Watershed Initiative

Figure 36 – Stakeholders signs tri-parish partnership agreement

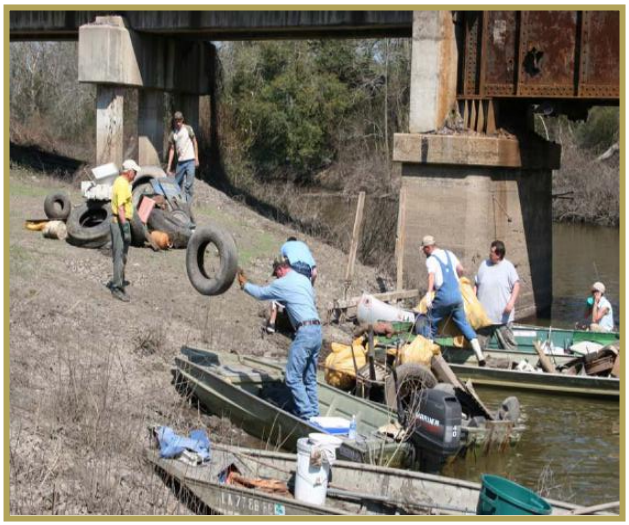


Figure 37 - Bayou Grosse Tete Task Force Team

Source Water Protection Program in Iberville Parish

During FFY 2011 SWPP staff presented the model ordinance to Iberville parish local officials. If adopted, the ordinance would limit certain activities contributing to contamination near drinking water wells. The ground water protection ordinance was adopted by the Town of Maringouin and the Village of Rosedale. The SWPP staff trained student volunteers from the University of Louisiana at Lafayette (ULL) how to conduct visits to owners and operators of significant potential sources of contamination and provide information on their drinking water and how they can protect it. The SWPP staff also assisted the parish in completing contingency plans for all parish water systems.

Vermilion-Teche Basin

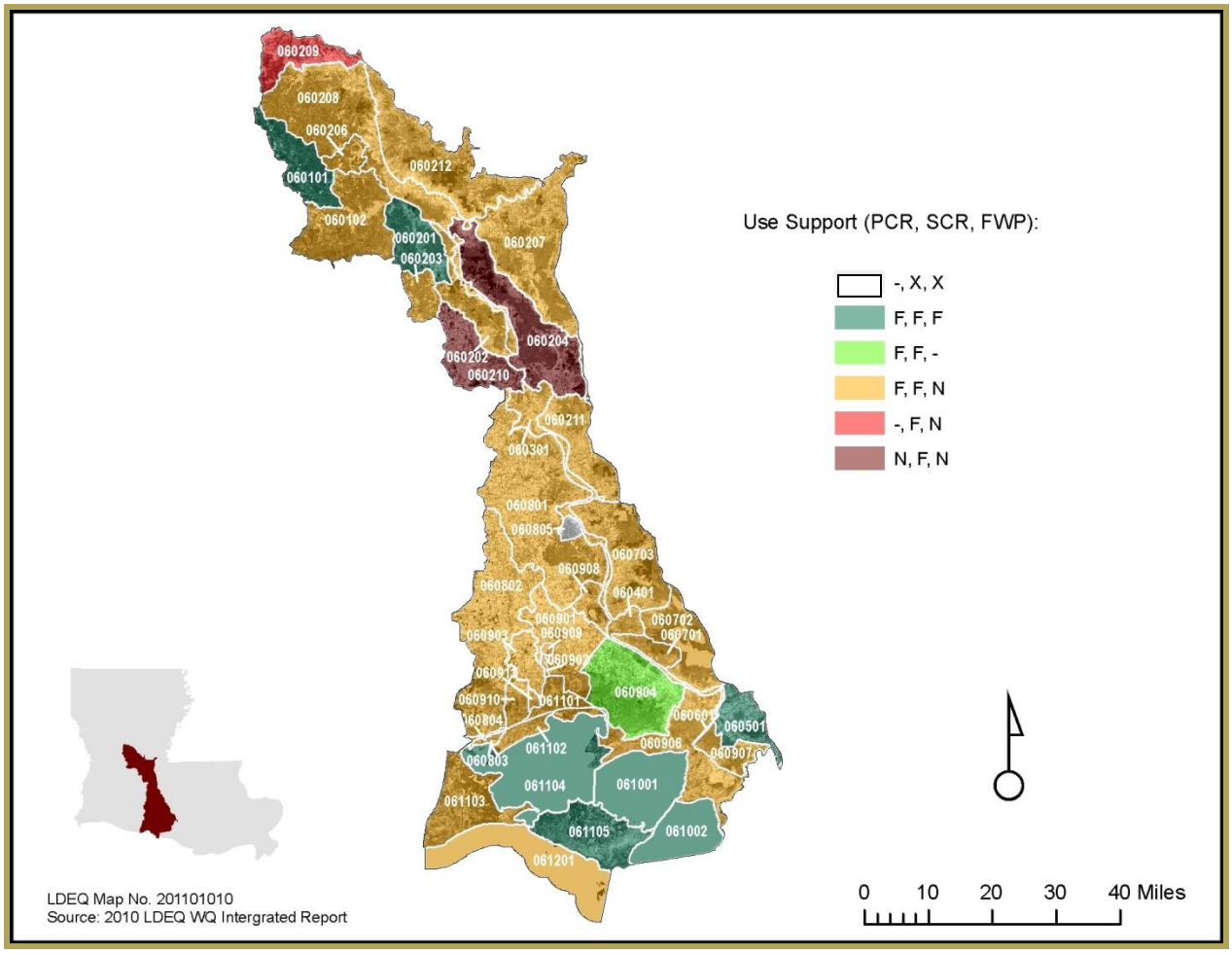


Figure 38 - Key for the above map is as follows: PCR-Primary Contact Recreation; SCR-Secondary Contact Recreation; FWP-Fish and Wildlife Propagation; F=Fully Supporting, N=Not Supporting

Appendix A of the state's 2010 IR identified 25 NPS impaired water bodies in Vermilion-Teche Basin. These NPS impairments included low DO and high concentrations of fecal coliform bacteria, turbidity, sedimentation/siltation, TDS, TSS or nutrients. Sources of these water quality impairments included agricultural crop production, rural residential areas, managed pastures and on-site treatment systems.

Appendix C of the state's 2010 IR indicated 24 water bodies in Vermilion-Teche Basin had improved, with delistings of DO, fecal coliform bacteria, TDS, TSS, sedimentation/siltation and turbidity, nutrients and metals between 2004 and 2010.

Figure 39 - Stakeholder Meeting in Arnaudville

Bayou Teche Watershed Implementation Plan

In FFY 2011, the Acadiana RC&D watershed coordinator developed a draft WIP for Bayou Teche (subsegments 060301 and 060401), which flows from central Louisiana to the Gulf of Mexico. These subsegments are both listed on the state's 2010 IR as not meeting FWP designated use for nitrate/nitrite, phosphorus, DO and carbofuran. A 1999 TMDL, revised in 2000, indicated no load reductions were needed. A 2001 TMDL was completed for fecal coliform, which was delisted in 2006 and removed from the 303(d) list. Major land uses in the watershed include agriculture (54.3%), forestry (32.4%) and urban (11.9%). According to LDEQ 2009 land-use maps, upper Bayou Teche watershed is comprised of 25% row crops, predominantly soybeans. Sources of NPS pollution identified in the state's 2010 IR included crop production and municipal point sources.

Historical data sampled at Breaux Bridge through 1998 and 2003, could not produce sufficient water quality data to model Bayou Teche tributaries. More extensive sampling is necessary to determine which tributaries contribute NPS pollutants to Bayou Teche. ULL partnered with LDEQ in 2011 to conduct bi-monthly water quality sampling at 15 locations which resulted in critical areas of NPS pollution being identified on the bayou to provide baseline data to evaluate effectiveness of future BMP implementation. ULL will also report on the effects of water diversions on water quality in Bayou Teche from fresh river water that is pumped from Atchafalaya River to Bayou Courtableau before it drains to Bayou Teche at Port Barre. These water diversions are for municipal, industrial, irrigation and water quality control uses. The QAPP was recently approved by USEPA and monitoring is expected to begin in early 2012.

The coordinator has partnered with mayors, parish presidents and other officials, Kiwanis Club, SWCDs, Bayou Vermilion District, Lafayette Consolidated Government, the TECHE Project and citizens to assist in WIP planning efforts to reduce NPS pollution in Bayou Teche. Urban runoff is a significant contribution to NPS pollution in this watershed. St. Landry and St. Martin parishes are MS4 parishes. As of 2011, St. Martin Parish is in good standing and continues to comply with their MS4 permit and St. Landry Parish and the City of Opelousas are in the process of writing MS4 plans. The MS4 requirements are focused at reducing urban stormwater.

Figure 40 - Water Sentinels Volunteer Training in Bayou Teche

BMP implementation and other practices will be focused on channelization, hydromodification, individual home sewage systems and agriculture. Channelization has created uniform water depths, reduced flow gradients and velocities in the watershed. Hydromodification affects the transport of water through the stream networks and often reduces the capacity of riparian zones to retain sediments on stream bank. In addition, the lack of riparian zones reduces shade over the stream, increasing water temperature. Individual home sewage systems contribute to nutrient and organic loadings to the watershed. Agriculture is the major contributor to nutrient loads in the watershed. According to LDAF 1,095,777.3 acres of BMPs have been implemented in the Bayou Teche watershed between 2005 and 2010.

Vermilion River Watershed Implementation Plan

The head waters of Vermilion River, described as subsegment 060801 flows from the City of Opelousas through Carencro to New Flanders Bridge in central Lafayette. Subsegment 060802 describes the portion of Vermilion River that flows through Abbeville to Intracoastal Waterway. The WIP for these two subsegments was revised in FFY 2011. The state's 2010 IR indicated that both subsegments were not meeting FWP designated use due to high levels of nitrate/nitrite, carbofuran and low DO. Agricultural activities comprise 61% of the land-use in these watersheds (i.e. sugarcane, soybeans, rice, beef cattle, pasturelands and grazing for cattle). The remainder of the watershed is comprised of urban (16%), wetlands (15%) and forests (4%).

A 1987 TMDL revised in 1999 to establish load reductions for DO and nitrogen suggests a 50% reduction in NPS pollutants is needed to meet the state's DO water quality standard of 5 mg/L during winter months and 3.5 mg/L during summer months. The TMDL also suggests a nitrogen load reduction of 10,180 lbs/day during summer months and 11,408 lbs/day during winter months. A 2001 TMDL for TSS, turbidity and indicates no load reductions are needed since in-stream loads were less than the TMDL allocation. TMDLs were completed for sulfates and fecal coliform, but were delisted for sulfates in 2004. Fecal coliform bacteria were delisted in sub-segment 060801 in 2010 and in 060802 in 2008.

Figure 41 - Vermilion River

LDEQ's ambient water quality monitoring data from 1998, 2003 and 2008 have been utilized as baseline data to evaluate NPS water quality improvements. Data collected through a NPS project with ULL from 2000–2004 on the effectiveness of BMPs for residential sites and sugarcane fields indicated NPS annual load reductions of 16%, 52% and 47% could be achieved for TSS, TN and TP, respectively. Similarly, pastureland BMPs could reduce TSS, TN and TP by 92%, 82% and 43%, respectively compared to the control pasture sites. These data quantified effectiveness of BMPs in controlling NPS pollution from sugarcane fields and pasturelands, but also indicated additional work will be necessary to determine effective BMPs for residential sites. ULL also designed a "model" conservation farm for BMP evaluation, demonstration and educational outreach activities.

Cost-share assistance projects with farmers should be focused on development and implementation of resource management plans (RMPs) to reduce NPS pollutants from agricultural areas. The types of BMPs that should be implemented include: conservation tillage, filter strips and grassed waterways. On forested sites, BMPs include selective-cut timber harvesting, water-bars and stream-side buffer zones. For urban and rural areas, environmental outreach and educational programs should focus on riparian zone restoration, stormwater management and maintenance of individual home sewage treatment systems. To reduce water quality impacts from hydromodification activities, NPS projects should be implemented to protect critical and sensitive wetlands and riparian areas in the watershed.

Figure 42 - Irises that will be used for future greenhouse propagation

A Comprehensive Strategy for Implementing BMPs to Improve the Quantity and Quality of Stormwater Entering the Vermilion River

The Vermilion River and its tributaries comprise the major stormwater conveyance system that receives most of the NPS pollution from Lafayette, St. Landry, and upper St. Martin parishes. A 2001 TMDL for DO indicated a 50% load reduction of oxygen demanding substances was needed to meet water quality standards. TMDLs finalized in 2002-2003 for fecal coliform, TSS and sulfates indicated an 88% reduction in fecal coliform loading from May 1 to October 31 was necessary to meet water quality standards for PCR use, but no reductions of TSS were needed. The TMDL also indicated that DO problems were related to a layer of benthic sediment that resuspends in the water column, combined with sediment from bank erosion and residential runoff.

In FFY 2011, Bayou Vermilion District (BVD) partnered with LDEQ, schools, universities, AmeriCorps, citizens, and local businesses on several projects using wetland plants, BMPs, educational outreach and water quality testing to demonstrate to residents along the river how to reduce suspended solids, organic material and nutrients by preventing stream bank erosion.

Native wetland plants often out-compete invasive species, providing protection of stream banks from erosion and runoff following rain events. With only a few local businesses selling native plants, BVD began constructing a plant nursery in 2011, consisting of a greenhouse and demonstration area to provide free native wetland plant seedlings and cuttings to homeowners, encouraging their use for riparian restoration and rain gardens to improve water quality, by reducing NPS stormwater runoff. Completion of this project was delayed due to weather conditions and is expected to be completed in 2012.

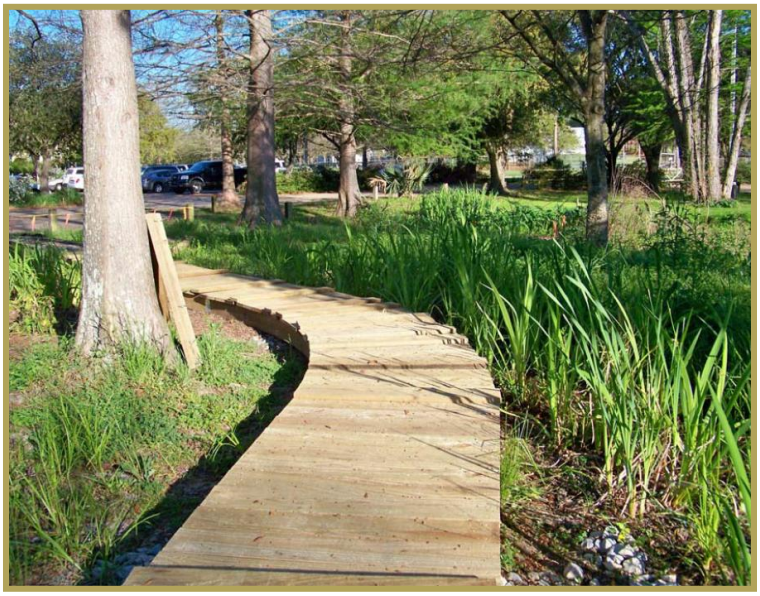


Figure 43 - View of rain garden from walkway

In addition, the following projects were completed in 2011: (1) a rain garden was constructed on the BVD office property demonstrating how NPS runoff and harmful pollutants can be intercepted and biologically processed before entering the River or its tributaries; (2) four 20' by 50' pervious parking lot surfaces were constructed at the BVD office to demonstrate how pervious surfaces reduce runoff by allowing water to be absorbed and filtered; (3) at educational workshops, residents constructed rain barrels that would be incorporated in landscapes, reducing stormwater runoff and improving low DO concentrations in the river; (4) invasive vegetation and sediment were removed from Bayou Petite retention pond, thereby increasing the bio-retention capacity and preventing flooding and stream channel erosion resulting from high runoff volumes and pollution, which should improve DO concentrations in the river; (5) replanting riparian zones along the bank of an existing pond, thereby increasing pollutant assimilation and reducing runoff and erosion; and (6) creation and development of educational brochures available to the public at BVD headquarters or website. As future water quality sampling is conducted, their data and implementation activities will be available on the BVD website.

Source Water Protection Program in Iberia Parish

Iberia Parish has 13 active public community ground water systems and one (1) purchasing system, eight (8) of these systems serve trailer parks or subdivisions. A community meeting held on September 30, 2011 in New Iberia presented the program to the public and five (5) volunteers formed a committee. The first committee meeting was held on October 28, 2010, electing Laura Downey, Iberia Parish Office of Homeland Security and Emergency Preparedness (OHSEP), as committee chair. The major concerns identified by the committee include salt water intrusion, individual home sewage systems, and abandoned water wells. Subsequent to this meeting the committee elected not to pursue drinking water protection projects or regular meetings at that time due to other resource and time consuming projects (i.e. roads, sewer, etc.) ongoing in the parish.

The SWPP staff met and presented the model ordinance to local officials. The Town of Loreauville adopted the ground water protection ordinance. Student volunteers from ULL completed site visits to owners and operators of significant potential sources of contamination providing information on their drinking water source and how to protect it. In addition, the SWPP staff assisted the parish water systems in completing contingency plans.

Figure 44 - Water well in Iberia Parish

Red River Basin

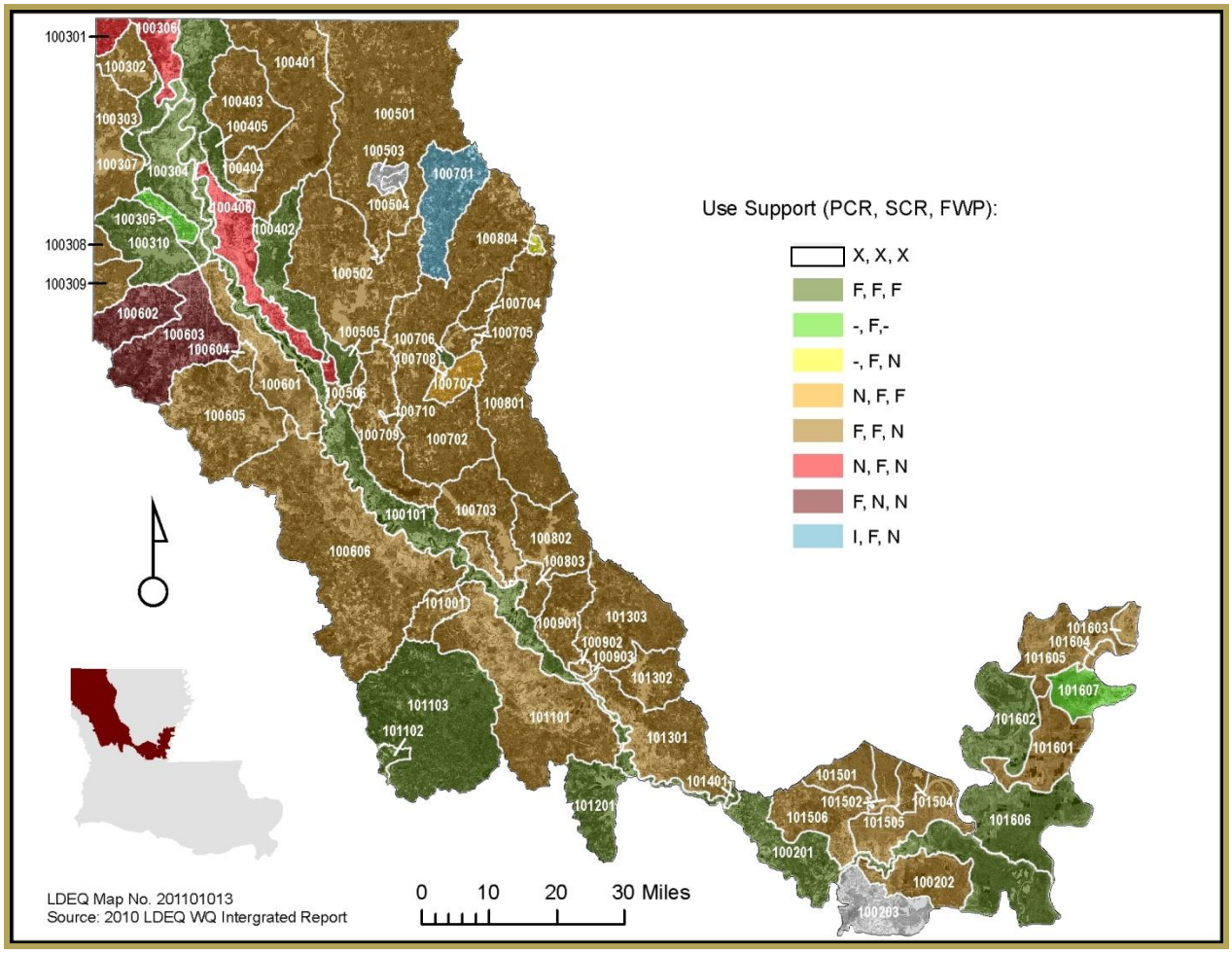


Figure 45 - Key for the above map is as follows: PCR-Primary Contact Recreation; SCR-Secondary Contact Recreation; FWP-Fish and Wildlife Propagation; F=Fully Supporting, N=Not Supporting

Appendix A of the state's 2010 IR identified 16 NPS impaired water bodies in Red River Basin. These NPS water quality impairments included low DO, fecal coliform bacteria, turbidity, non-native aquatic vegetation and nutrients. Sources of these water quality impairments included agricultural crop production, individual home sewage systems, managed pasture grazing, site clearance from development or re-development and rural residential areas.

Appendix C of the state's 2010 IR indicated 41 water bodies in Red River Basin had improved with delistings for DO, nutrients, TSS, TDS, sedimentation/siltation and turbidity, Oil & Grease, metals, high pH and mercury between 2004 and 2010.

Figure 46 - Iatt Lake

Iatt Lake Watershed Implementation Plan

In FFY 2011, a WIP was developed for Iatt Lake (subsegment 101302), located in central Louisiana in Red River Basin and Grant Parish. The 2010 IR indicated it is not meeting the FWP designated use due to mercury, non-native aquatic plants and low DO. A 2008 TMDL for DO indicated that a 53% reduction in NPS oxygen demanding substances was needed to meet the state's DO standard of 5.0 mg/L. Reductions from lake fertilization, individual home sewer systems and runoff from agriculture and forest operations will be needed to restore Iatt Lake. Forestry is the major land-use, comprising more than 80% of the watershed with rural lands and pasture/idle lands at less than 4% and 2%, respectively.

Data collected at two (2) LDEQ ambient water quality sampling sites from 2002 through 2010 have been analyzed to determine critical areas in the watershed for BMP implementation and also as a baseline to quantify effectiveness of BMP implementation. The data collected indicated DO values fall below the state's water quality standard during warmer months of the year, but fecal coliform standards are being met. More than 50% of the samples collected for TDS exceeded the 100 mg/L standard for the lake. The majority of nitrogen samples were reported below 0.05 ppm (detection limit) with a few spikes around 0.27 ppm. Phosphorus samples were reported as low as 0.05 ppm with the majority below 0.15 ppm and a few spikes above 0.25 ppm.

A SWAT model utilized ambient water quality data to identify critical areas within the lake where installation of BMPs would be most effective. Data from 2006 through 2009 were utilized to calculate NPS related parameters on a monthly and annual basis. The watershed was delineated into 93 sub-basins and analyzed for sediment, organic nitrogen, organic phosphorus, soluble and mineral phosphorus yields and nitrate in surface runoff. The model generated a list of the top 20 potential sub-basins for BMP implementation, including high sediment yields in four (4) forested sub-basins, indicating the possibility of improving water quality by implementing forestry BMPs on relatively small acreages in the watershed.

According to the LDHH public health unit, there are approximately 97 permitted individual home sewage systems that discharge in or near the edge of the lake. The most effective BMPs for home septic systems include routine inspection and maintenance. In 2012, the NPS project manager plans to meet with local authorities on the adoption of a sewer system ordinance and inspection program.

Non-native vegetation was first discovered in the lake in 1996 with hydrilla verticillata and in 2008 with salvinia minima. The lake has been drawn down a few times in the last two (2) decades by LDWF in an attempt to remove the vegetation. The concern is, left untreated, hydrilla could replace most of the native vegetation. Reducing non-native vegetation will require educational outreach on how to control and properly dispose of vegetation to further prevent the spread and re-introduction of invasive species. In 2012, the NPS project manager plans to meet with LDWF to develop educational outreach activities to reduce non-native vegetation in the lake.

Figure 47 - Two project test plots on I-49

Highway Right-of-Way Erosion Remediation: Implementation of a Residue Management BMP

The Highway Right-of-Way Erosion Project began in 2009 and is scheduled for completion in April 2012. The goal of the project has been to quantify the effectiveness of mulch/compost as an erosion control BMP on one (1) right-of-way area located on Highway 61 in St. Francisville and three (3) right-of-way areas located on Interstate 49 south of Alexandria. A mulch/compost mix (50% wood chips/50% compost) was applied via a blower truck to four (4) sets of paired plots on four (4) separate sites representing a range of slopes and soil types. Two (2) of the eight (8) plots were designated as control plots and received no mulch/compost and the remaining plots received either 2" or 4" of mulch/compost mix bordered by a metal boundary inserted into the soil surface. Light tillage with an auto-tiller was performed on selected plots. The three (3) sites on I-49 are located on destabilized and actively eroding soils. Auto samplers, H-flumes, data loggers and moisture probes were installed at all four (4) sites.

All sites have been carefully monitored with stormwater runoff samples collected and analyzed after rainfall events to evaluate their effectiveness during the past two (2) years. The sites with surface-applied compost (no tillage) appear to be largely stabilized with limited erosion, while the tilled plots typically developed rills. Two inches of mulch/compost appear to be sufficient to prevent erosion in most plots. Results indicate sites with mulch/compost retain more moisture within the soil and cause soil temperatures to remain cooler than untreated control plots. Runoff has been collected at some sites, following heavy rainfall events, but other sites have yet to yield samples. This could be due to enhanced infiltration as a result of mulch/compost application and/or variability in rainfall patterns. Cheese cloth was wrapped around inlet ports on control plots to prevent clogging during intense rainfall events which may have reduced TSS values. Controlled runoff analyses performed in FFY 2011 concluded that the mulch/compost mix should reduce sediment pollution from highway projects throughout the state.

Caddo Lake Institute's Environmental Flows Study

Figure 48 - Caddo Lake

LDEQ has been participating in stakeholder meetings for Caddo Lake Watershed, hosted by the Caddo Lake Institute (CLI). During FFY 2011, LDEQ partnered with LDNR and LDHH on a response to proposed flow alterations to tributaries of Caddo Lake. In early December 2011, LDEQ assisted LDNR and LDHH with a presentation on water quality and quantity issues on the Louisiana side of Caddo Lake. LDEQ and LDNR presented information on a field trip to the Caddo Lake dam and LDNR made a presentation at the Caddo Lake stakeholder meeting in Jefferson, Texas. Currently, Caddo Lake meets water quality standards for contact recreational uses and is impaired for mercury in fish tissue.

Source Water Protection Program in Webster Parish

Webster parish has 33 active community public water supply systems; all are ground water systems. The SWPP staff plan to introduce the program to water system personnel and local government officials in 2012. They will work with water system personnel to develop contingency plans and present the model ground water protection ordinance to local governments for their consideration. They will host community meetings to introduce the program to the general public and work with community volunteers on drinking water protection activities in the parish.

Calcasieu River Basin

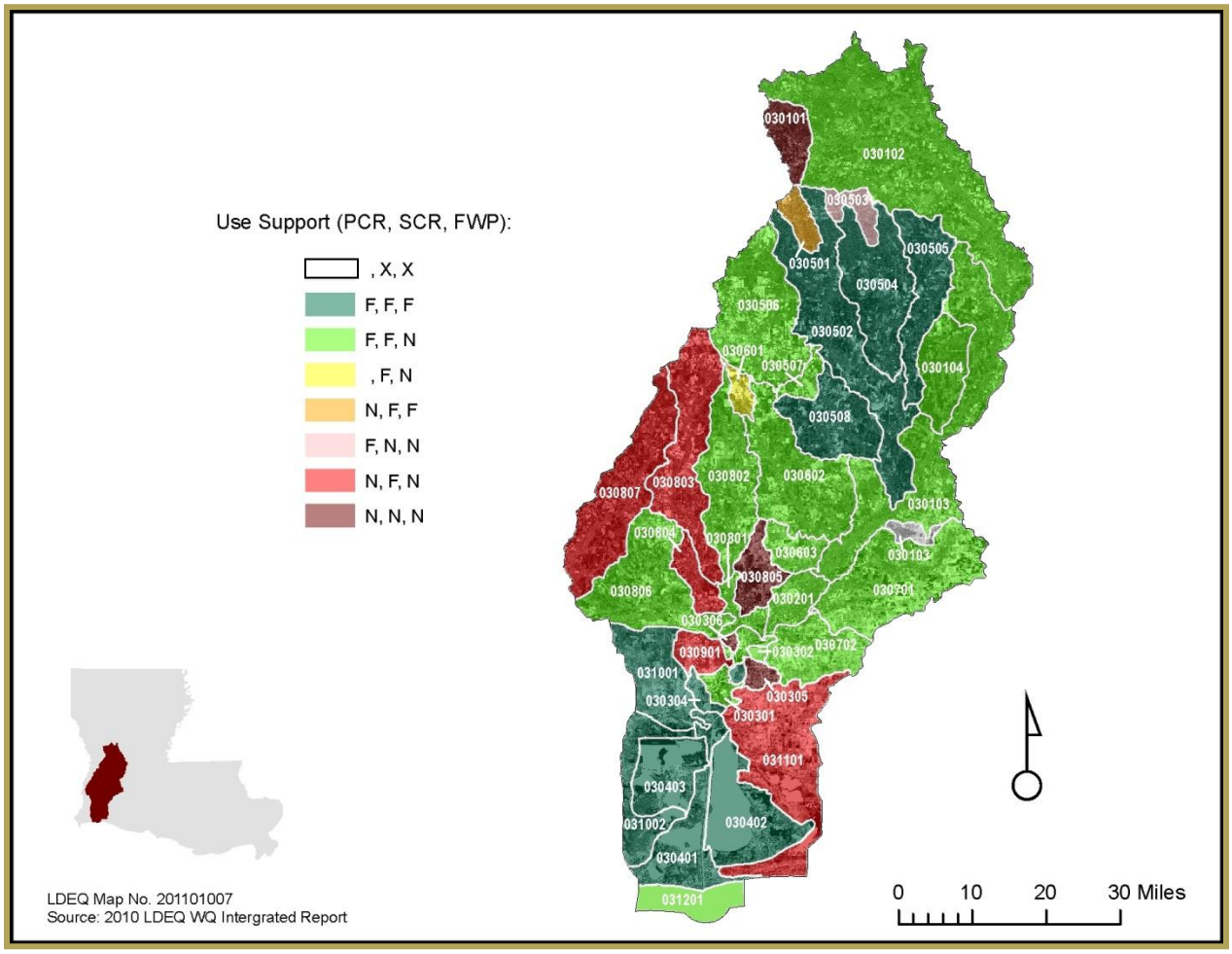


Figure 49 - Key for the above map is as follows: PCR-Primary Contact Recreation; SCR-Secondary Contact Recreation; FWP-Fish and Wildlife Propagation; F=Fully Supporting, N=Not Supporting

Appendix A of the state's 2010 IR identified 17 NPS impaired water bodies in Calcasieu River Basin. These NPS water quality impairments included low DO and high concentrations of fecal coliform or turbidity. Sources of these water quality impairments included agricultural crop production, silvicultural activities, rangeland, flow alterations from diversions and natural conditions.

Appendix C of the state's 2010 IR indicated 29 water bodies in the Calcasieu River Basin had improved with delistings for fecal coliform bacteria, priority and non-priority organics and low DO concentrations between 2004 and 2010.

Marsh Bayou Watershed Implementation Plan

Figure 50 - Forestry Site receives Award for Conservation

In FFY 2011, the Marsh Bayou (subsegment 030603) WIP originally developed in 2003 was revised. The bayou is located in southwestern Louisiana, northeast of Lake Charles, east of DeQuincy, and south of Reaves and flows through four (4) parishes (Beauregard, Allen, Calcasieu and Jefferson Davis) before entering Calcasieu River. The state's 2010 IR indicated that it's not FWP designated use due to low DO. A 2001 TMDL for DO indicated a 67% reduction in NPS pollutants is needed to meet water quality standards during critical low flow conditions in summer and fall months. Water quality data analyzed from 1999, 2005 and 2008/2009 indicated seasonal trends of low DO during summer months, when temperatures increased and DO levels decreased.

An AnnAGNPS watershed model identified priority areas in headwater regions of both Marsh Bayou and Little Marsh Bayou that have the highest potential to yield NPS loads. The results indicated that all land use activities throughout the watershed contributed to low DO conditions. The model also points out a ridge extending across the watershed from east to west just below its northern watershed boundary that exhibits a higher potential for soil erosion and that erosion in these areas can be as high as 1.032 tons/acre/year and nearly half of that amount is deposited in the upper reaches of the watershed. The watershed model estimated a similar pattern when evaluating nitrogen, phosphorus, and organic carbon loads. The areas of land just below the northern watershed boundary exhibited a higher potential of nutrient loading. A possible explanation could be that these areas of the watershed have higher elevations and sandy soils, thereby a greater potential for erosion and water runoff.

A 2011 TMDL indicated that an 82% reduction in fecal coliform bacteria is needed during the winter months and a 98% is needed during the summer months to meet water quality standards. Water quality data indicated spikes of 16,000 and 9000 col/100mL in April 2005 and April 2009, respectively. Turbidity values spike in the month of April similar to fecal coliform spikes with values of 300 NTU in April 2005 and 600 NTU in April 2009, both of which exceed the state's water quality guideline of 50 NTU for Calcasieu River. Similarly, TSS values indicate similar spikes as DO and turbidity with 78 ppm in April 2005 and 151 ppm in April 1999.

Parameter	WQ standard	April 1999	April 2005	April 2008/2009
Dissolved Oxygen	5.0 mg/L all year	<5.0 mg/L 7 out 12 months	<5.0 mg/L 6 out of 9 months	<5.0 mg/L 5 out of 7 months
Fecal Coliform Bacteria	200 (summer) 1000 (winter)		16000 COL/100mL	9000 COL/100mL
Turbidity	50 NTU		300 NTU	600 NTU
TSS		151 ppm	78 ppm	
TKN			4.27 ppm	7.33 ppm

Table 6 - Ambient Water Quality Analysis for Marsh Bayou

An explanation of these spikes during April could be attributed to a flush of pollutants from smaller streams and tributaries after heavy rainfall events. During times of drought, pollutants may be retained in smaller upstream reaches and tributaries to Marsh Bayou. During springs with heavy rainfalls, higher water levels could, produce sufficient hydraulic energy and shear stress to flush these pollutants downstream to Marsh Bayou. LDEQ will be collecting additional ambient water quality data in this area in 2012 and 2013.

The watershed is characterized by 54% pastureland, 38% forestry and 2% agriculture with few residential and no urban areas. Agricultural activities consist of rangeland, soybean, rice and pastureland grazing. Forestry activities occur throughout the watershed. Historical forestry operations resulted in sediment and organic debris loads that altered hydrology of the bayou. With below average flow rates, the bayou functions like a "sink" where organic debris and nutrients become trapped after rainfall events, consuming in-stream oxygen. Today, most of forestry impacts result from access roads and increased rates and amounts of surface runoff.

In FFY 2011, LDEQ partnered with Calcasieu Gravity Drainage District and SWCD stakeholders. FEMA has been approached by all four (4) parishes to assist with debris removal projects within the bayou.

NPS Pollution Reduction through Enhancement of On-Site Wastewater Disposal Systems Inspection and Education Outreach

The Calcasieu River Basin located in southwestern Louisiana, contains 13 subsegments not meeting PCR designated use for fecal coliform bacteria. Four (4) of these watersheds: Marsh Bayou (subsegment 030805), Hickory Branch (subsegment 030802), Contraband Bayou (subsegment 030305) and Indian Bayou (030805) are primarily comprised of rural areas north and south of the City of Lake Charles. The four (4) areas included in this project are primarily affected by unsewered areas or individual home sewage systems that are not maintained properly. Two (2) of these watersheds have TMDLs completed for low DO. A 2001 TMDL for Marsh Bayou and a 2004 TMDL for Indian Bayou both indicated a 60% reduction of NPS loading is needed to meet the state's DO water quality standards. WIPs for Marsh Bayou and Indian Bayou were revised in 2011. Fecal coliform baseline data has been obtained from four (4) LDEQ ambient water quality monitoring stations located within these four (4) watersheds.

Calcasieu Parish has incorporated a parish ordinance (Chapter 22 of the Parish Code of Ordinances) to improve water quality by requiring individual home sewage systems to be replaced, rehabilitated and properly maintained. The parish plans to assist parish residences and businesses to adhere to this new ordinance, through educational outreach and by providing certified inspections to an estimated 33,000 individual home sewage systems located in the unincorporated areas of Calcasieu Parish over the next three (3) years. This project is expected to enhance the existing parish inspection program and encourage residential maintenance contracts for these systems.

In preparation for these inspections, a GIS mapping program was developed in FFY 2011 for tracking progress in the inspections. On July 1, 2011, a meeting was held to finalize detailed change requests and recommendations regarding color coding, map designations, and computer interfacing to the program and three (3) areas of focus were selected for the initial inspections prior to inspection implementation. Three (3) existing parish code enforcement officers, with 57 years of combined experience as master plumbers, certified residential electrical inspectors and ICC certified plumbing and electrical inspectors will initiate the individual mechanical inspection program. These inspectors and the parish grant administrator attended a State Sanitary Code approved on-site waste water installers' workshop in August 2011, designed to clarify state waste water regulations. All four (4) inspectors have successfully attended and completed their required LDHH course and exam.

To provide information to parish residents for the new inspection program, a ten-minute interview was held with the Assistant Development Director and Senior Environmental Specialist and aired 28 times from July 15th - 22nd, 2011 on the government channel and was also made available via YouTube on the Calcasieu Parish Police Jury website. Public service announcements (PSAs) and individual mechanical sewer system information flyers have also been developed. Three (3) separate PSAs were developed and aired twelve times daily, following the September 2011, mail-out to 7,182 residents located in the initial focus area. A dedicated automated phone line, directing callers to either the parish website or operator has been initiated to assist residents with information and questions regarding the new inspection program projected to begin in 2012. The public awareness campaign has encouraged residents to contact installers and have their home sewage systems inspected prior to initiation of the parish inspection program.

Mermentau River Basin

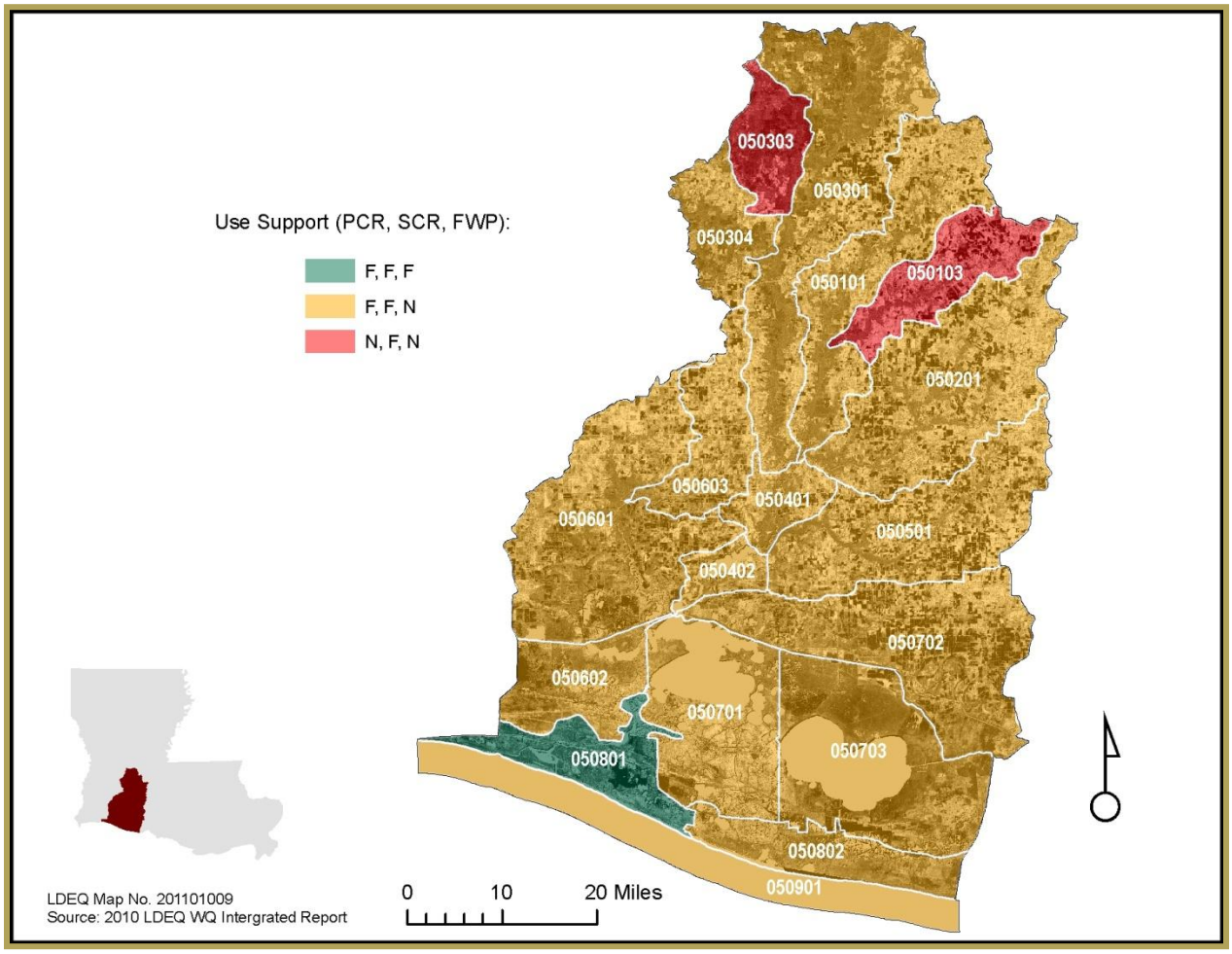


Figure 51 - Key for the above map is as follows: PCR-Primary Contact Recreation; SCR-Secondary Contact Recreation; FWP-Fish and Wildlife Propagation; F=Fully Supporting, N=Not Supporting

Appendix A of the state's 2010 IR identified 12 NPS impaired water bodies in Mermentau River Basin. These NPS water quality impairments included low DO and high concentrations of fecal coliform bacteria, TSS, TDS, turbidity, sedimentation/siltation and nutrients. Sources of these water quality impairments included agricultural crop production, managed pastures, drainage/filling/loss of wetlands, sediment resuspension and natural conditions.

Appendix C of the state's 2010 IR indicated nine (9) water bodies in Mermentau River Basin had improved with delistings of DO, nutrients, fecal coliform bacteria, TDS, TSS, sedimentation/siltation and turbidity between 2008 and 2010.

Figure 52 - Coulee Baton Monitoring Workshop for stakeholders and locals

Coulee Baton Micro-watershed NPS Pollution Monitoring and Modeling Project

In 2009, the Vermilion SWCD chose a micro-watershed as a focus area for quantifying and reducing NPS pollutant loads. Coulee Baton was selected for BMP implementation by landowners and homeowners to specifically address NPS water quality problems. The objectives of the project were to monitor water quality, establish baseline information to quantify effectiveness of BMPs in reducing NPS pollutant loads and identify critical areas for BMP implementation.

In FFY 2011, ULL completed water quality monitoring and land-use analysis at seven (7) sites along Coulee Baton and utilized data to develop a SWAT model. Analysis of the monitoring data (see table below) concluded that surface water quality in Coulee Baton is affected by sediments, nutrients and fecal coliform.

Parameters	Water quality monitoring data
DO	Ranged between 1.2 to 14.4 mg/L with an average of 6.86 mg/L.
BOD_5	Ranged between 1.98 to 85.3 mg/L with an average of 23.43 mg/L suggests a high level of BOD_5 indicating the presence of a high level of organic substances in surface water.
TS	Ranged between 108 to 5719 mg/L with an average of 428.1 mg/L.
TDS	Ranged between 56 to 4356 mg/L with an average of 273.5 mg/L.
Turbidity	Average value of 245.2 NTU.
TKN	Average value of 1.28 mg/L

Table 7- Analysis of water quality monitoring data in Coulee Baton

Water quality data indicated that a range of land-use types in the watershed delivered NPS pollution to Coulee Baton, primarily agricultural lands and individual home sewage systems. Water quality data also indicated that fecal coliform levels were reduced following implementation of the NPS individual home sewage systems project.

Critical areas of high sediment, nitrogen and phosphorus loads were associated with sugarcane production, pastures and residential areas. Once critical areas were identified, Vermilion SWCD notified producers about cost-share programs available to assist them with BMP implementation. BMPs will continue to be recommended by SWCD and ULL in critical areas of the watershed and evaluated for effectiveness to show water quality improvement in this micro-watershed.

Hydromodification projects in Mermentau River Basin

Hurricanes Gustav and Ike produced large rains and extensive flooding in Louisiana, resulting in fallen trees and storm debris in many of the state's water bodies. Federal grant funds have been provided through hurricane recovery programs to remove storm debris

and restore natural hydrology to local streams, bayous and rivers. LDEQ made a number of recommendations on a project for West Fork of Caney Creek in Mermentau River Basin to include hydromodification BMPs that prevent damage to the stream bank and riparian habitat. The Allen Parish Policy Jury agreed to limit the number of access points to the creek and to stabilize the spoil banks with native vegetation. The BMPs should reduce erosion and prevent further degradation of the bayou from sediment oxygen demand.

MRBI Monitoring Project located in the Mermentau River Basin

For FFYs 2010 through 2013, USDA has allocated approximately $80 million in federal funds for 12 states through the MRBI to implement BMPs that reduce nutrient loads affecting local and gulf coast waters. In Mermentau River Basin, four (4) 12-digit HUCs were selected through MRBI, including Bayou Chene in subsegment 050603 and East and West Bayou Lacassine and Thornwell Drainage Canal in Bayou Lacassine, subsegment 050601.

Bayou Chene and Lacassine Bayou flow through the Mermentau River Basin, which is the focus area for USDA's MRBI. The 2010 IR lists Fipronil, lead, mercury, and DO for Bayou Chene and lead, mercury and low DO for Lacassine Bayou as not meeting FWP designed use. The suspected sources of DO impairment include irrigated and non-irrigated crop production for Bayou Chene, and irrigated crop production, managed pasture and natural conditions for Lacassine Bayou.

The Bayou Lacassine watershed is located in the southwestern portion of the Mermentau River Basin. The area is sparsely populated and dominated mainly by agriculture.

Bayou Chene flows from the headwaters to Lacassine Bayou and includes Bayou Grand Marais. There are three Grand Marais waterbodies: the East–into Bayou Lacassine below Welsh. The lower end of Bayou Chene is affected by tidal flux from the Gulf of Mexico and occasionally experiences reverse flows. The primary land use in the watershed is agriculture, particularly rice and soybeans. Irrigation of rice and other crops has a significant impact on water quality in this area.

This project will involve water quality monitoring to generate surface water quality data from 10 to 12 sampling locations in the Bayou Chene watershed and 10 sampling sites in the Lacassine Bayou watershed. Field parameters will be measured in situ and water chemistry samples collected on a weekly basis; biological samples will be collected twice a year (May-June and September-October) and analyzed for species diversity and abundance. The goal of this project is to evaluate the effectiveness of, from MRBI. Water quality data collection is expected to begin in March 2012.

Barataria Basin

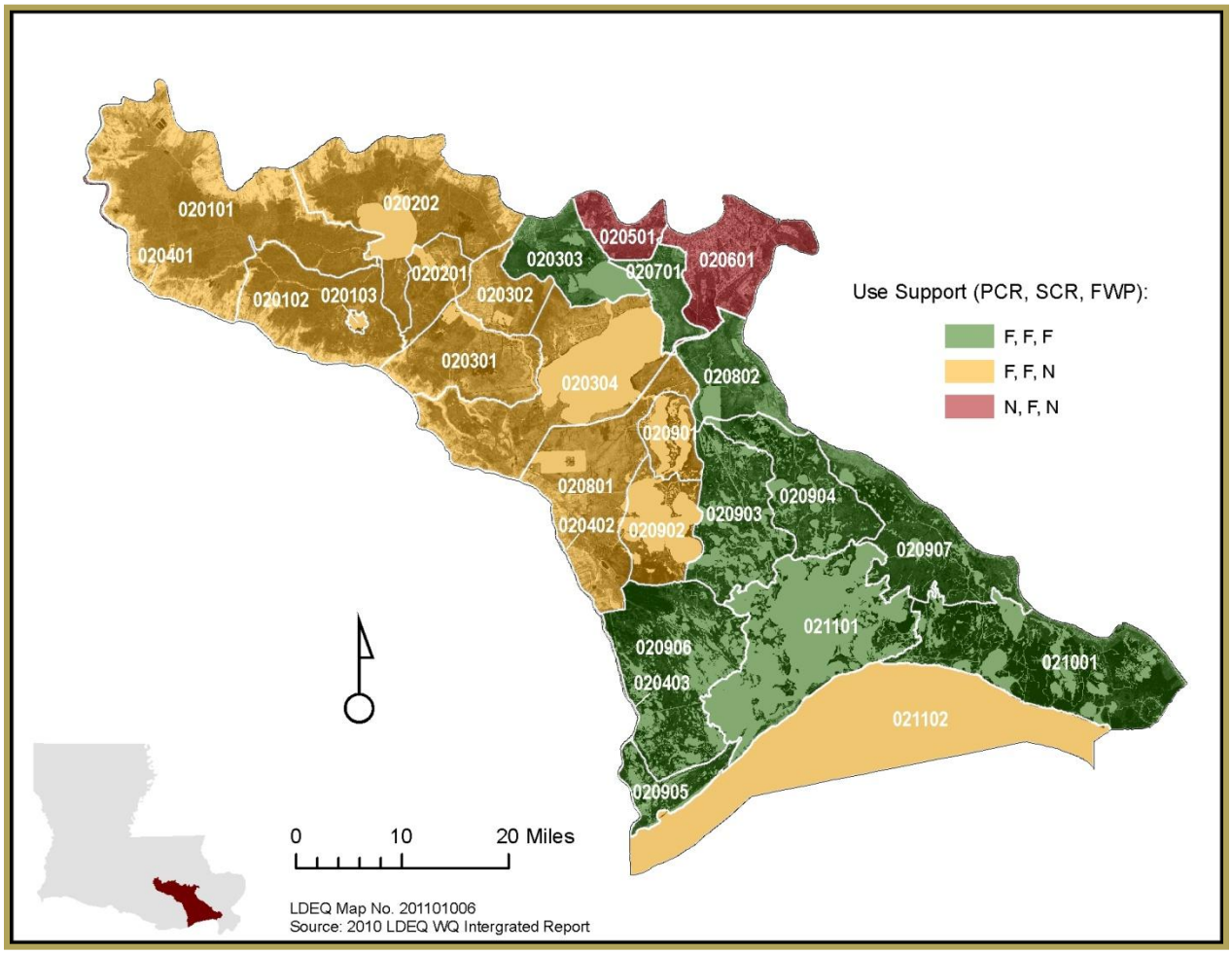


Figure 53 - Key for the above map is as follows: PCR-Primary Contact Recreation; SCR-Secondary Contact Recreation; FWP-Fish and Wildlife Propagation; F=Fully Supporting, N=Not Supporting

Appendix A of the state's 2010 IR identified six (6) NPS impaired water bodies in Barataria Basin. These NPS water quality impairments included nutrients and low DO or high concentrations of fecal coliform bacteria. Sources of these water quality impairments included agricultural crop production, individual home sewage systems, managed pastures and habitat alterations.

Appendix C of the state's 2010 IR indicated 27 water bodies had improved with delistings of fecal coliform, mercury, oil & grease, total suspended solids (TSS), turbidity, nutrients, pesticides and DO between 2004 and 2010.

Water Quality Modeling to Support the Use of NPS Pollution to Restore Natural Wetlands in Barataria Basin

Figure 54 - Water quality sampling by cooperator

LDEQ completed a TMDL in 2003 for Bayou Boeuf, Halpin Canal, Theriot Canal (subsegment 020102) and Lake Boeuf (subsegment 020103), indicated a 100% reduction in oxygen demanding substances during the summer months and a 92% reduction during winter months is needed to meet the state's water quality standards for DO. The model also recommended that natural background loads would need to be reduced by 37% during summer months. The two (2) predominant land-use types in subsegment 020102 are wetland forests and agriculture and in subsegment 020103 are primarily fresh marsh and open water. The traditional approach would be to partner with sugarcane farmers to implement agriculture BMPs to reduce runoff of sediment, nutrients and organic material. It may not be possible to achieve these high NPS load reductions recommended in the TMDL with traditional NPS approaches.

Coastal restoration projects are planned for Theriot Canal and Lake Boeuf, diverting water from the Mississippi River and introducing sediment and nutrients to the marshes and wetlands. To understand how NPS and coastal restoration goals can be achieved in NPS impaired waters, a pilot project was conducted in 2009 to determine the benefits of diverting NPS runoff from agricultural fields to adjacent wetlands rather than to receiving water bodies.

Over the duration of the project, water quality samples were collected at 12 open water sites, two (2) forested and two (2) emergent wetland sites. An extensive literature review was conducted of historical and current ecological indicators for the Boeuf watershed. Soil cores, hydrological bathymetric surveys were also conducted and water level recorders were deployed, with discrete velocity measurements taken at seven (7) locations. A hydrologic modeling program was developed to determine if in-stream water quality standards could be met with or without Mississippi River inputs to this watershed. Model outputs provided information on whether these wetlands benefit from the introduction of NPS loads from sugarcane fields. The modeling results support the state's decision to allow a range of management scenarios to be considered when and where nutrient reduction requirements exist.

Spoil banks in Boeuf watershed were mapped to allow a conceptual model to illustrate how hydrologic processes function to deliver water to the wetlands. The hydrologic model

examined a variety of scenarios for spoil bank gap intervals and widths to determine which gap interval would most efficiently deliver water to the wetlands for pollutant removal. Although the literature indicates that wetlands are effective for nutrient and sediment removal; modeling in the Boeuf watershed indicated maximum nitrogen reductions of only 5.7% with the most efficient spoil bank interval: gap ratio of 500m:5m. This nitrogen removal rate was much lower than the anticipated 50% range, possibly because dredging drainage channels has resulted in water levels no longer inundating surrounding wetlands, except during extreme storm events.

Though a 5.7% reduction in nitrogen levels is almost negligible, this reduction can be attained at a minimal or no cost to the state, since the parish government is responsible for dredging drainage canals in Boeuf watershed and to create spoil bank gaps. The principle investigator for the project recommended that the parish government be requested to make all future spoil banks gaps at the 500m:5m interval:gap ratio to benefit nutrient reduction in this area.

Source Water Protection Program in Assumption, Lafourche, and Terrebonne Parishes

LDEQ's focused its drinking water protection program in Bayou Lafourche on reducing fecal coliform bacteria entering the bayou. Bayou Lafourche provides drinking water for Assumption, Lafourche, Ascension and Terrebonne parishes. LDEQ contracted with Nicholls State University (NSU) to identify sources of fecal coliform bacteria in lower Bayou Lafourche from Labadieville to Valentine, LA. This section was prioritized because of high population densities. A final report was provided to LDEQ which identified eleven locations as "hot spots" that are contributing sewage to the bayou from surrounding neighborhoods. During FFY 2011, LDEQ SWPP and Water Quality Survey staff partnered with NSU to identify areas contributing fecal coliform from sewage for upper Bayou Lafourche from Donaldsonville to Labadieville, LA. LDEQ's Water Quality Survey and SWPP staff collected samples which were analyzed by NSU. Sample collection and analysis will continue through August 2012 and a final report will be submitted to LDEQ.

SWPP staff partnered with LDHH, BTNEP, Bayou Lafourche Fresh Water District (BLFWD) and local officials in Ascension, Assumption, Lafourche, and Terrebonne Parishes to develop an implementation strategy and identify options to reduce the amount of fecal coliform bacteria entering Bayou Lafourche. Active participation by local governments, especially the Lafourche Parish Council, will be required to implement many of the options identified, which include:

- utilizing existing LDHH regulations;
- adoption of a parish ordinance to provide more local oversight;
- connection of individual home sewage systems to a centralized community system;
- formation of new community systems;
- replacement or rehabilitation of malfunctioning individual home sewage systems; and

- educational outreach activities encouraging proper maintenance of individual home sewage systems

SWPP staff is currently partnering with BTNEP, LDHH, and BLFWD on an educational outreach program to educate local residents on proper maintenance of individual home sewage systems.

LDEQ's regional staff has conducted inspections in areas identified as contributing fecal coliform loads to Bayou Lafourche. LDEQ has conducted compliance inspections on all permitted discharges that contribute fecal coliform to the bayou. LDEQ's NPS staff will focus on efforts to reduce fecal coliform loads from individual home sewage systems entering Bayou Lafourche.

In 2011, sample collection and analysis will continue for upper Bayou Lafourche through August 2012. Educational outreach activities will also be implemented to encourage proper maintenance of individual home sewage systems.

Figure 55 - SWPP staff sampling from bridge crossing

Figure 57 - Fecal Coliform sample being prepared for lab analysis

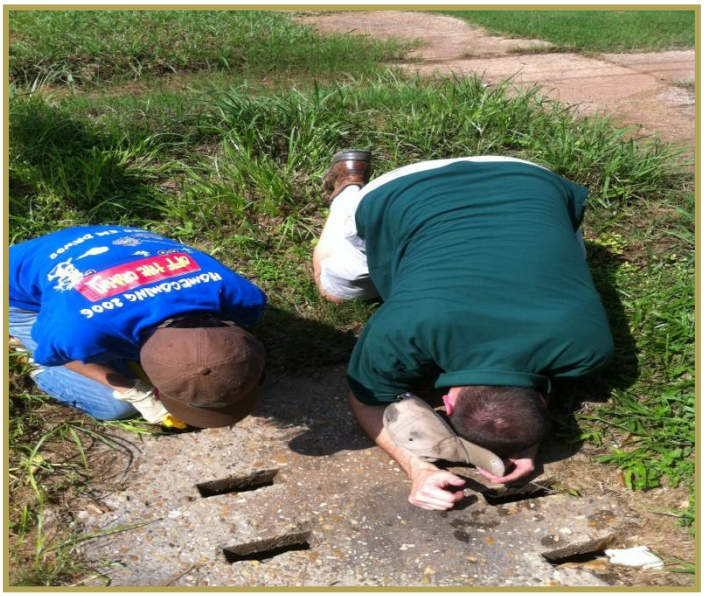


Figure 56 - SWPP staff working with local volunteer

Pearl River Basin

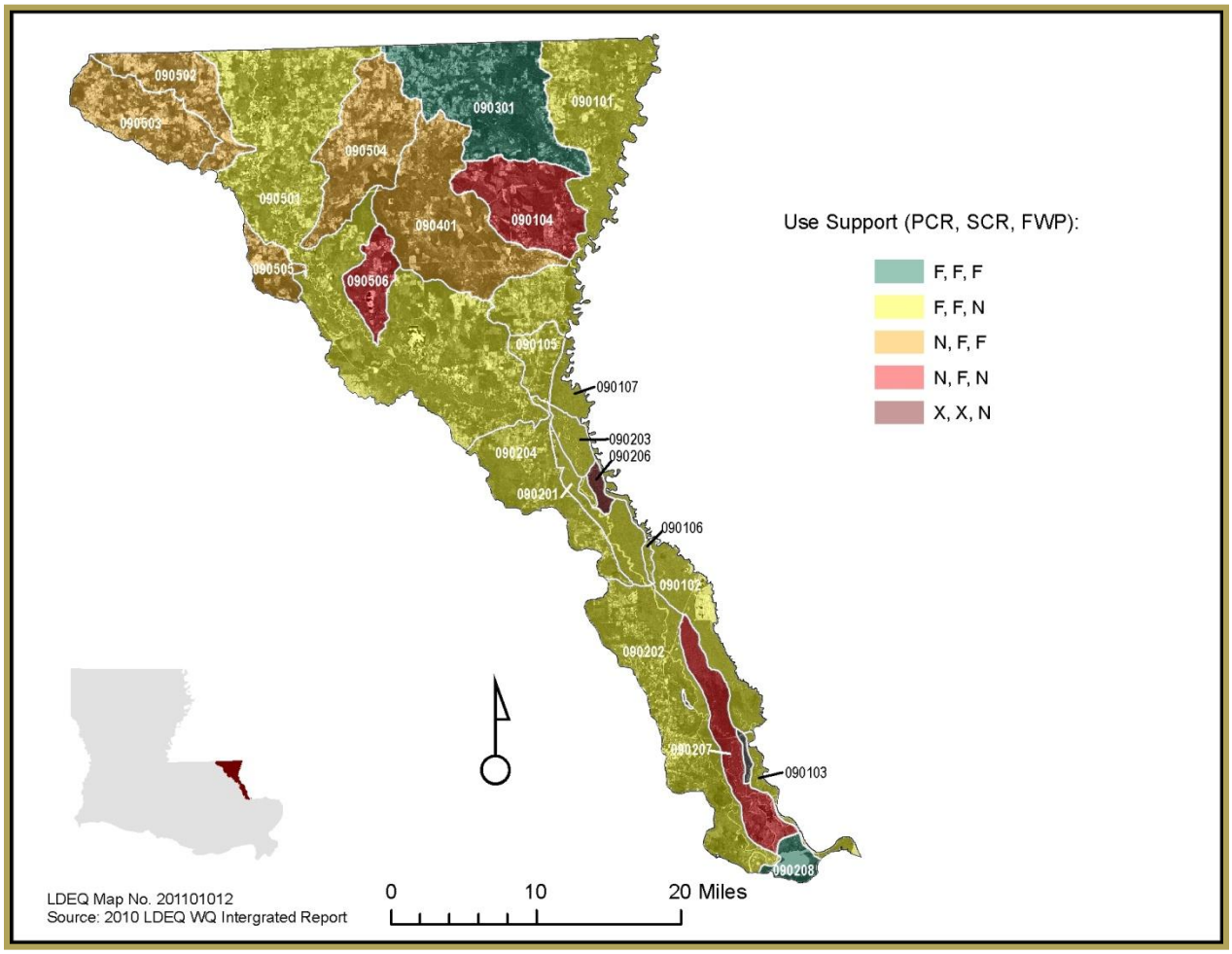


Figure 58 - Key for the above map is as follows: PCR-Primary Contact Recreation; SCR-Secondary Contact Recreation; FWP-Fish and Wildlife Propagation; F=Fully Supporting, N=Not Supporting

Appendix A of the state's 2010 IR included five (5) NPS impaired water bodies in Pearl River Basin. These NPS water quality impairments included low DO and high concentrations of fecal coliform bacteria and turbidity. Sources of these water quality impairments included individual home sewage systems, drainage/filling/loss of wetlands, habitat modifications, silvicultural harvesting and sources outside of the state's jurisdiction.

Appendix C of the state's 2010 IR indicated that 14 water bodies in Pearl River Basin had improved with delistings of metals, nutrients, fecal coliform bacteria, DO, TSS, TDS, sedimentation/siltation, turbidity and Low pH between 2004 and 2010.

Little Silver Creek Watershed Implementation Plan

In FFY 2011, a WIP was developed for Little Silver Creek, located in southeast Louisiana in Washington and Tangipahoa parishes. The state's 2010 IR indicated subsegment 090503 was not meeting PCR and SCR designated uses due to fecal coliform bacteria. The suspected sources of water quality impairment include unpermitted discharge (domestic waste) and wildlife other than waterfowl. A 2010 TMDL for fecal coliform indicated that a 68% reduction in NPS pollutant loads is needed during the winter months and a 98% reduction is needed during the summer months to meet water quality standards. The majority of land-use in the watershed is forestry (53%), agriculture (42.8%), and pasture/hay (42.6%) with only 0.4% in urban.

A field survey of the watershed was conducted in 2011 to identify potential pollutant sources. The types of agriculture operations in the watershed included beef and dairy farms, soybeans and corn, and pasturelands. Silviculture exists throughout the watershed. Gullies were observed in areas where fields have been clean tilled. Conservation tillage is a common practice in the watershed. In 2011, pasture renovators have been made available to farmers throughout the watershed. Use of the renovators allows more rain water and fertilizer to reach root zones of pasture grasses, resulting in less runoff to receiving streams. Fences are commonly utilized in the watershed by farmers to keep cattle out of the streams and to prevent stream bank erosion. Corn was often planted too close to the edge of fields, allowing nutrients to runoff to receiving streams after rain events.

LDEQ ambient water quality data collected during 2001, 2006 and 2008/2009 in Little Silver Creek indicated fecal coliform spikes:

Date of sample	Fecal coliform value	Exceed water quality standards for
March 2001	16,000 COL/100mL	SCR designated use
September 2001	1,700 COL/100mL	PCR designated use
March 2006	5,000 COL/100mL	SCR designated use
August 2006	500 COL/100mL	PCR designated use
September 2006	1,700 COL/100mL	PCR designated use
October 2006	1,700 COL/100mL	PCR designated use
September 2008	500 COL/100mL	PCR designated use

Table 8 - Ambient water quality data collected during 2001, 2006 and 2008/2009 in Little Silver Creek indicated fecal coliform spikes.

The values for turbidity were relatively low with only one spike above the state's water quality guideline of 50 NTU, in October 2006, of 66 NTU. DO values indicated that the state's water quality standard was maintained at or above 5.0 mg/L. TSS values were typically higher in 2006 than in 2001 and TDS values all fell below the state's water quality standard.

Nutrient levels in Silver Creek varied from year-to-year, with highest and lowest values included in this table:

Parameter	Highest	Lowest
Total Kjeldahl Nitrogen (TKN)	October 2006 1.77 ppm	October 2008 0.12 ppm
Nitrate-nitrite	February 2006 0.69 ppm	May 2009 0.24 ppm
Phosphorus	October 2008 0.51 ppm	October 2008 0.06 ppm

Table 9 - Nutrient levels in Little Silver Creek

The highest priorities for BMP implementation were divided into categories such as forestry, agriculture and urban. Forestry BMPs to reduce sediment and erosion should be implemented throughout the watershed. Maps should be utilized to prioritize areas for BMP implementation, including riparian zones along streams, those sites with steeper slopes or highly erodible soils. Preservation of riparian areas along tributaries prevents NPS loads from silvicultural, agricultural and urbanized areas enter the receiving streams. In the past five (5) years, USDA has implemented a range of BMPs within Silver Creek watershed, including: conservation cover, conservation crop rotation, residue and tillage management, critical area planting, waste treatment lagoons, ponds, fencing, riparian forest buffer, access control, forage harvest management, forage and biomass planting, prescribed grazing, heavy use area protection and nutrient management. In 2012, the SWAT model will be utilized to identify critical areas in the watershed where BMP implementation should provide the highest NPS reductions.

Figure 60 - Area where Conservation Tillage practice utilized in Little Silver Creek Watershed

Figure 59 - Little Silver Creek

Sabine River Basin

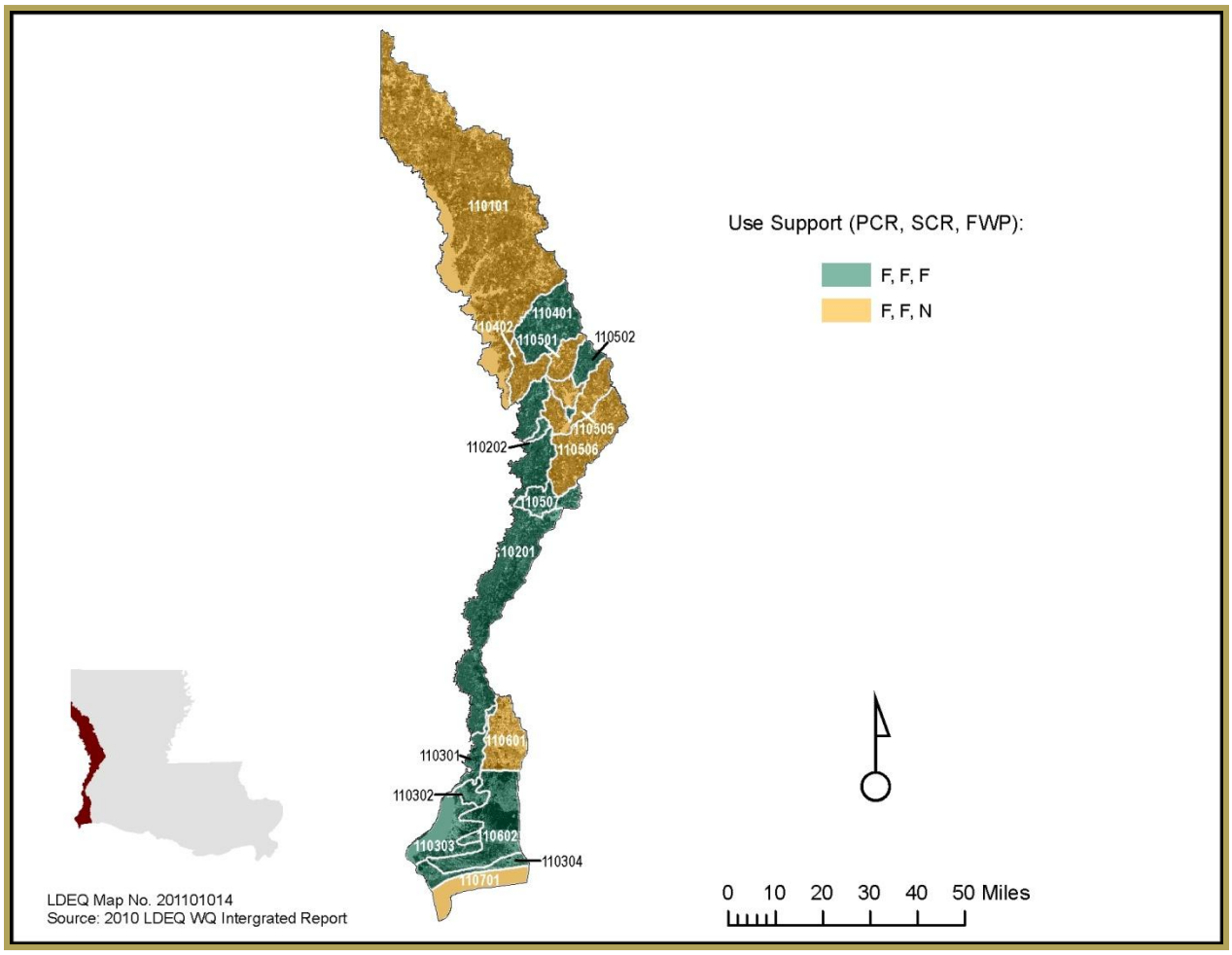


Figure 61 - Key for the above map is as follows: PCR-Primary Contact Recreation; SCR-Secondary Contact Recreation; FWP-Fish and Wildlife Propagation; F=Fully Supporting, N=Not Supporting

Appendix A of the state's 2010 IR included six (6) NPS impaired water bodies in Sabine River Basin. These NPS water quality impairments included color, low DO and high concentrations of turbidity and TDS. Sources of these water quality impairments included silviculture activities, managed pastures, natural sources, rural residential areas and unspecified land disturbance.

Appendix C of the state's 2010 IR indicated ten (10) water bodies in Sabine River Basin had improved with delistings for metals, fecal coliform bacteria, priority organics and turbidity between 2004 and 2010.

Figure 62 - LDAF and the local SWCD planted about 1200 bullwhips on about 5 foot center on the canal banks where the area was dredged

Vinton Waterway Watershed Implementation Plan

In FFY 2011, Imperial Calcasieu RC&D watershed coordinator developed a WIP for Vinton Waterway subsegment 110601. The watershed is located in the southwestern part of the state in Calcasieu Parish and classified as an estuarine system. The state's 2010 IR indicated the watershed is not meeting FWP designated use due to low DO. A 2007 TMDL for turbidity indicated that a 65% reduction in NPS pollutants is needed to meet the state's water quality standard. The land-use surrounding the watershed is mostly rural and undeveloped with approximately 10,000 acres in agriculture land dedicated to rice, soybeans, sugarcane, crawfish and livestock with the larger amount dedicated to pasture and hay for livestock production. Hydromodification, individual home sewage systems, agriculture and urban runoff contributed to these high levels of nutrients and organics in the watershed.

LDEQ's ambient water quality data did not indicate any trends or seasonal patterns in NPS pollutants. An analysis of TSS versus turbidity indicated a strong correlation between high TSS and turbidity values. In turbid waters, suspended solids often result in lower DO concentrations, related to microbial degradation of organic compounds attached to the sediment. These organic compounds often include nutrients, organics, and toxic substances such as pesticides and petroleum residues. Natural tidal fluctuations often result in re-suspension of benthic sediments being redistributed into the water column, resulting in lower in-stream DO. Unprotected stream banks also cause an increase in sediment loads from tidal flushing and wave action. Construction and agriculture activities often contribute sediment to receiving streams, if BMPs are not implemented. Similarly, urban areas often contribute contaminants such as motor oil, heavy metals, litter, fertilizers, pesticides and untreated or poorly treated sewage to receiving streams.

By reducing sediment loads from 5 tons/acre to 1.75 tons/acre for agricultural croplands, 1.1 tons/acre to less than 0.4 tons/acre for pasturelands and 3 tons/acre to 1.05 tons/acre for forested lands, the TMDL load reduction goal of 65% could be reached. BMP programs will be implemented through a multi-agency partnership including NRCS, LSU AgCenter, USDA-Agriculture Research Service (ARS), LDEQ, City of Vinton, and agricultural producers.

A Citizen's Group comprised of a local landowner, her children and other interested citizens organized in Vinton Waterway has been actively collecting monthly water quality samples at several locations in the watershed since February 2011. Beginning April 2011, the watershed coordinator collected monthly water samples for one (1) year to determine critical areas for BMP implementation. Water samples were collected at three (3) locations in the watershed. Two (2) of the sample sites were located on major tributaries of the water body and the third was collected below the point where these two (2) tributaries enter Vinton waterway. The water quality samples collected were analyzed for total organic carbon (TOC), TSS, BOD and fecal coliform.

Figure 63 - Watershed Coordinator and residents planting bullwhips on Vinton

In early 2011, a dredging project was completed on 9,000 feet of exposed stream banks susceptible to erosion from boat traffic and wind driven wave action. LDAF and Gulf Coast SWCD partnered to plant native California bulrush in September 2011.

Figure 64 - Storm drain marking in Vinton

Appendix A: Milestones to Meet Water Quality Goals

Activity Milestones to Meet Water Quality Goals	2011	2012	2013	2014	2015	2016
Statewide Agricultural Milestones						
Annually Evaluate Progress in Each of These Activities	✓					
Partner with LDAF on Data-sharing and BMP Implementation for Pesticides	✓					
Continue to Implement Nutrient and Sediment BMPs in Agricultural Watersheds	✓					
Continue to Prioritize Water Bodies Impaired for Fecal Coliform Bacteria for Water Quality Improvement, Partial and Full Restoration	✓					
Expand Statewide Educational Programs to include Electronic Media and Tools	✓					
Continue to Partner with LDNR-OCM on implementation of CNPCP	✓					
Reduce the Number of Agricultural Watersheds Impaired by NPS Pollution (2011 is Baseline, based on 2010 IR); Cropland (Irrigated and Non-Non Irrigated Crop Production)	**85**					
Reduce the Number of Agricultural Watersheds Impaired by NPS Pollution (2011 is Baseline, based on 2010 IR); Pastureland (Managed Pasture)	**10**					
Determine if Additional Steps are Necessary to Improve Water Quality in Agricultural Watersheds	✓					
Statewide Forestry Milestones						
Annually Evaluate Progress in Each of these Activities	✓					
Host a Series of Forestry Water Quality Workshops to Increase BMP Compliance Rate						
Continue to Implement Forestry and Streambank Protection BMPs in Forested Watersheds						
Expand Statewide Educational Programs to Include Electronic Media and Tools						
Continue to Partner with LDNR-OCM on implementation of CNPCP	✓					
Reduce the Number of Forested Watershed Impaired by NPS Pollution (2011 is Baseline, based on 2010 IR)	**17**					
Determine if Additional Steps are Necessary to Improve Water Quality in Forestry Watersheds	✓					
Statewide Individual Home Sewage Systems						
Annually Evaluate Progress in Each of these Activities	✓					
Increase Coordination with LDHH and Parishes on Inspection Programs for Individual Home Sewage Systems	✓					
Examine New Technologies to Determine Feasibility of Reducing Nutrient and Bacteria Loads from Individual Home Sewage Systems	✓					
Coordinate with State Revolving Load Fund Program in Parishes/Watersheds where Community Systems could replace Individual Systems	✓					

Activity Milestones to Meet Water Quality Goals	2011	2012	2013	2014	2015	2016
Partner with LDNR-OCM on implementation of CNPCP	✓					
Reduce the Number of Water Bodies Impaired by Fecal Coliform Bacteria from Individual Home Sewage Systems (2011 is Baseline, based on 2010 IR)	**61**					
Statewide Resource Extraction Milestones						
Annually Evaluate Progress in Each of these Activities	✓					
Coordinate with Office of Conservation on Potential Restoration Opportunities for Sand and Gravel Mines	✓					
Reduce the Number of Water Bodies Impacted by Sand and Gravel Mining Activities (2010 IR Baseline)	**1**					
Statewide Construction Milestones						
Annually Evaluate Progress in Each of these Activities	✓					
Coordinate with LDOTD on Programs to Reduce Sediment from Road and Highway Projects	✓					
Reduce the Number of Water Bodies Impacted by Road and Highway Construction Activities						
Coordinate with Parishes and Municipalities to Reduce Sediment from Residential Construction Projects	✓					
Partner with LDNR-OCM on implementation of CNPCP						
Urban Stormwater Milestones						
Annually Evaluate Progress in Each of these Activities	✓					
Continue to Host Educational Outreach Activities with Municipalities on Green Infrastructure and Stormwater BMPs/Ordinances	✓					
Partner with Stakeholders on Nutrient Reduction Activities in Urban and Rural Communities	✓					
Provide Materials to Municipalities on Urban NPS Pollution, BMPs and Ordinances for Reducing Pollutant Loads	✓					
Hydromodification Milestones						
Annually Evaluate Progress in each of these Activities	✓					
Continue to Make Recommendations through SOV and 401 Water Quality Certification processes to Local Parish Drainage Boards and Police Juries on Hydromodification BMPs	✓					
Track Water Quality Improvements that Result from these Recommendations						
Reduce the Number of Water Bodies Impaired by Hydromodification Activities (2011 is Baseline, based on 2010 IR)	**2**					
Source Water Protection						
Develop contingency plans for water systems in targeted communities in the event of an emergency or loss of the water supply	**59**					
Disseminate BMPs through visits to businesses considered potential sources of contamination to drinking water supplies	**260**					
Partner with each committee to introduce a drinking water protection model ordinance for adoption by local governments	**20**					
Coastal Nonpoint Pollution Control Program						
Continue to implement CPNCP management measures for each category identified as contributing to coastal NPS pollution	✓					
Continue to partner with LPBF, BTNEP and Atchafalaya Basin Programs on coastal NPS program activities	✓					

Activity Milestones to Meet Water Quality Goals	2011	2012	2013	2014	2015	2016
Continue to partner with coastal parishes to implement management measures for urban, home sewage and hydromodification	✓					
Continue to partner with LDAF, USDA and LSU AgCenter to implement management measures for agricultural and forestry	✓					
Continue to collect water quality data and evaluate effectiveness of management measure implementation in improving water quality	✓					